

THE REPUBLIC OF MOZAMBIQUE
NATIONAL INSTITUTE FOR THE DEVELOPMENT OF SMALL SCALE FISHERIES
MAPUTO CITY ADMINISTRATION

**PREPARATORY SURVEY REPORT
ON
THE MAPUTO FISH MARKET
CONSTRUCTION PROJECT
IN
THE REPUBLIC OF MOZAMBIQUE**

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FEBRUARY 2012

**JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)
OAFIC CO., LTD.**

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PREFACE

Japan International Cooperation Agency (JICA) decided to conduct the preparatory survey and entrust the survey to OAFIC Co., Ltd.

The survey team held a series of discussions with the officials concerned of the Government of Mozambique, and conducted a field investigations. As a result of further studies in Japan, the present report was finalized.

I hope that this report will contribute to the promotion of the project and to the enhancement of friendly relations between our two countries.

Finally, I wish to express my sincere appreciation to the officials concerned of the Government of the Republic of Mozambique for their close cooperation extended to the survey team.

February 2012

Teruyoshi Noshiro
Director General,
Rural Development Department
Japan International Cooperation Agency

SUMMARY

Summary

The Republic of Mozambique (hereinafter referred to as “Mozambique”) has a total population of 22.89 million (source: the World Bank, as of FY2009) and consists of a total land area of 799,000km². Mozambique is located between approximate 10 degrees 27 minutes south latitude and approximate 26 degrees 52 minutes south latitude in the eastern area of the African Continent. The capital Maputo city, where the Project site is located as the target region of the Project, is located in the high latitude close to South Africa and belongs the subtropical climate zone. The Maputo city has a total population of 1,888,000 (source: EIU, as of FY2010). Mozambique’s GNI per head per year was 440 US dollars in 2009 (source: the World Bank) and Mozambique’s economic growth was 6.3% in the same year (source: the World Bank). Furthermore, Mozambique’s total GNI in FY 2009 was approximately 9.7 billion US dollars (source: the World Bank). The contribution ratios of industries to GDP are approximate 13.1% for the primary industries, 26.9% for the secondary industries and 57.3% for the tertiary industries (source: 2011, the World Bank). Mozambique is an agricultural country with a fertile land and forest resources and has much production of monetary convertible products for export such as cashew nuts, sugar, cotton and etc. Furthermore, Mozambique has a long coastal line fronted to the Indian Ocean and has much production of the fishery products such as shrimp, etc. The Government of Mozambique attaches importance to the agricultural development especially, executes the financial and tax system reform and aims at the magnification of the private sector, the continuous economic growth and the overcome of the poverty.

The Government of Mozambique displays the artisanal fisheries development which aims especially at the improvement of the quality of life of the poor society. In April, 2007, the Ministry of Fisheries made the Strategic Plan for Artisanal Fisheries Development (2007-2011), which sets up the National Five-year Development Program (2005-2009) and the Poverty Reduction Program (2006-2009) as the higher ranked programs. The afore-mentioned Strategic Plan sets up the improvement of the quality of life of the artisanal fisheries community as a direct object and aims at “improvement of health, reinforcement of education and assurance of water supply in the community”, “increase of profitability of the fisheries activities”, “enlargement of marketing network of the fishery products”, “promotion of financial services” and “rigorousness and efficiency of the administration in the fisheries sector”. In this context, this Project concerns “enlargement of marketing network of the fishery products” and “increase of profitability of the fisheries activities”.

Around the Maputo city of the Project target area, A Luta Continua Market is a sole public market, where the fishery products are marketed exclusively, and the products dealt in this market are mainly supplied by the artisanal fisheries. Because this market is a spontaneous facilities for fresh fish marketing in the present place, which was offered by the Maputo city’s administration in 1986 to the street retailers through regulation process against street retailing activities of the fishery products and the commercial cooking services has been developed there from meals services to the

fish retailers, the market infrastructures such as ceiling provision, pavement, water & electricity supply, car parking provision and storage arrangement have not been realized intentionally. The Maputo City Administration demarcates the public markets into the Group A (the market infrastructures are well developed), the Group B (the market infrastructures are developed but not yet enough) and the Group C (the market infrastructures are not yet developed) with depending on the grade of development of the market infrastructures shown above and in accordance with the “Guidelines for Operation & Management of Maputo Public Markets, 2008”. A Luta Continua Market is categorized in the Group C. Furthermore, it becomes a big problem that A Luta Continua Market does not satisfy the following important guidelines instructed in these guidelines and the hygienic conditions there are necessary to be improved.

- ① The retailing, storage and primary processing of the fishery products must not be conducted in the place which is suffered directly by sunshine & rainfall and /or contacted directly to factories, chemical gas, dusts, floating goods and rats.
- ② The fresh fish, its fillets and fishery products to be retailed in the next day must be stored in the storage of the adequate temperature or kept in the condition of mixture of ice.
- ③ The scaling and gutting of the fish must be conducted at the specified retail counter or at the exclusive place.

Under such circumstances, the Government of Mozambique formulated “The Maputo Fish Market Construction Project” with the aims of the removal of A Luta Continua Market, the improvement of the market facilities and the improvement of fresh fish marketing and also in 2008 requested the grant aid cooperation from the Japanese government in support of the rebuilding of the market and the provision of the ice making facilities.

In response to this request, Japan International Cooperation Agency (JICA) conducted the Preparatory Survey for Program for Rural Development and Continuous Economic Development (Fisheries Sector) from May, 2007 and confirmed the status of the fisheries sector in the Project site and in Mozambique and the contents of the request. The following bottlenecks remained unsolved.

- ① The explanation of the contents of the Project to the relevant stakeholders was not yet held and the establishment of the relevant mutual agreement is not clear.
- ② It was not confirmed which was the implementation body for the Project, the National Institute for the Development of Small Scale Fisheries (the body of requesting a grant aid cooperation, hereinafter referred to as “IDPPE”) or the Maputo City Administration (the body of operation of the market to be constructed).
- ③ As the area of Triunfo in the Maputo city was proposed as a substitute site for the original site which was considered as unsuitable, this was not yet confirmed officially.

Under such circumstances, JICA conducted the Preparatory Survey (part 1) for Construction of Maputo Fish Market from January, 2010 and examined the necessity, propriety and urgency as a project for a grant aid assistance in the fisheries sector, examined the appropriate scope and scale of

that assistance, collected the necessary information to confirm the propriety for implementation of the preparatory survey for outline designing, and confirmed the followings with regard to the above mentioned bottlenecks.

- ① As the relevant stakeholders meeting was held during the survey period of this survey with being hosted by the Mozambique side, the market removal plan including the removal site was agreed mutually.
- ② It was confirmed that the responsibility agent is the Ministry of Fisheries, both IDPPE and the Maputo City Administration are designated as the implementation agency and the operation agency after completion of construction the fish market is the Maputo City Administration.
- ③ It was confirmed in the concerned Minutes of Discussions that Triunfo is the official Project site and also the drawing showing borderlines of the Project site and the permission document for construction of the new fish market were confirmed.

On the other hand, in the Preparatory Survey (part 1), the reporting of the activities of the market removal committee and its decisions and the submission of the operation & maintenance plan for the new fish market from the Mozambique side were considered to be necessary before initiating Preparatory Survey (part 2). As the completion of these matters were confirmed, JICA dispatched this Preparatory Survey (part 2 : Outline Design Study) for outline designing as the following schedule:

Outline Design Study : 13, March – 15, April, 2011

Explanation of the Draft Outline Design: 26, September –2, October, 2011

From the field survey and analysis, the survey team identified and examined the background and details of the Project, natural conditions, operation and management planning, plus conditions of building construction and material procurement. The results led to the conclusion that, in order to improve the hygienic conditions of the fresh fishery products marketed in the target area of the Project, it would be necessary to re-establish the retail functions of the fresh fishery products and the cooking services functions as well as to establish the fish market, its relative facilities, cooking services facilities and ice-supply system, which would satisfy the conditions for the Group A (the public market category where the market infrastructures such as ceiling provision, pavement, water & electricity supply, car parking provision, etc. are basically arranged). It was decided that during the course of the Project, the Japanese Assistance, by means of grant aid cooperation, would realise the construction of Retail Booths, Administration Office, Chilled Room, Stock Room for Chest-freezers and Ice Making Plant of the Fish Market, Car Parking, Garbage Storage Building, Public & Staff Toilets, Foodcourt, Sewage Disposal Facilities, Power Substation and Elevated Water Tank and procures the market equipment such as insulated fish boxes, scales, etc. The outline design is described as follows:

Facilities		Detail / Scale
Maputo Fish Market	Retail Building	Retail Booths (100 retail sections), Stock Room for Chest-freezers (10 places), Administration Office, Technical Staffs Room, reception area, toilets in office, machine room, Ice Making Plant (2tons/day, 10tons ice storage), Chilled Room (13.4m ²), etc., total floor area of 1,572m ² , reinforced concrete construction and partly steel structure, one storey & partly two storey.
	Power Substation	Electricity receiving facilities (down transformer 200 KVA), Emergency Generator (50 KVA), total floor area of 60m ² , reinforced concrete construction, one storey.
	Public Toilet Building	Toilets for customers and staffs, reception space for usage tickets, total floor area of 169m ² , reinforced concrete construction, one-storey.
	Garbage Storage Building	Storage for Garbage from Raw Materials, Place for Garbage Container, washing place, total floor area of 16m ² , reinforced concrete construction, one-storey building.
	Foodcourt	Interlocking pavement floor, total floor area of 494 m ² , independent steel pillar structure.
	Elevated Water Tank	Pump Room, Water Tank (6 tons), total floor area of 26m ² , reinforced concrete construction.
	Sewage Disposal Facilities	Aeration system tank for sewage disposal (32 m ³ /day), Facilities for penetrating treated effluent to underground, total floor area of 11m ² , reinforced concrete construction.
	Outdoor Facilities	Storm drain (U shape gutter, 334 m), storm drain (box culvert type, 70 m), pavement (interlocking type, 2,282m ²), Water Reservoir (32 tons, ground type)
Shore Protection		Armor stone type slope shore protection: Armor stone (1 ton load/piece, 2 layers), stone for consolidation of foundation (1 ton load/piece, 2 layers), length of protected shoreline 210 m, apron (thickness of concrete 20 cm, width 5.0 m), recurved parapet (reinforced concrete construction, height of main structure 2.0 m), storm water outlet (1unit, 19.5 m in length).
Equipment		Insulated Fish Box (30 liters capacity): 40 boxes, Cart (50 kg load, stainless steel made): 5 units, Primary Processing Table for Fresh Fish (attached with the chopping board): 10 units, Platform Scale (100 kg): 2 units and Scale (4 kg): 2 units.

When implementing this Project by means of grant aid cooperation which is provided by the Japanese government, it requires a total implementation period of 19.0 months consisting of approximately 3.5 months for the details design and the tender documents approval process, approximately 2.5 months for the following tender and contracting process of the construction contract and approximately 13.0 months for the construction period such as shop drawing approval, construction, inspection, etc. The project cost borne by the Mozambique side is estimated as 129,484,000 Meticaís.

Subsequent to the implementation of this Project, the cost incurred by the operation and maintenance of the Maputo Fish Market is estimated to be approximately 408,450 Meticaïs per month whereas the income gained mainly from facility usage charges is estimated to be approximately 661,800 Meticaïs per month. As it is considered to be possible to assure the budget for mid & long term maintenance when 35,000 Meticaïs (less than 15 % of the monthly operation profit: 253,350 Meticaïs) are reserved monthly, it is considered that sound finance of the operation & maintenance of the Maputo Fish Market will be assured. On the other hand, it is necessary to conduct not only the ordinary building painting repair but also the periodical maintenance such as change of imported spare parts of the refrigeration equipment and such a cost for maintenance is assumed high. Then, with regard to the maintenance it is necessary to reserve the budget for periodically maintenance and entrust the work for changing spare parts to the engineering companies and also it is necessary to make a careful maintenance planning.

With regard to the propriety for implementing the Project, the following matters are expected.

- ① The beneficiaries by this Project are ordinary nations such as artisanal fishermen, retailers, etc. including poverty society and those numbers are a lot.
- ② The facilities and equipments of this Project are possible to be operated and maintained by the personnel, techniques and funds of the Mozambique side without any special advanced technology.
- ③ This project contributes the achievement of the objectives of the Strategic Plan for Artisanal Fisheries Development of Mozambique.
- ④ The profitability of the operation in this Project is of a range for expectation for smooth operation & maintenance of the facilities and equipment of the Project.
- ⑤ Though there are negative impacts in social & environmental factors such as occurrence of the business transfer of the concerned parties of the existing market, adequate measures are taken for eliminating the related influence.
- ⑥ This Project is possible to be implemented under the system of Japanese grant aid cooperation without any special difficulty.

With regard to the effectiveness for implementing the Project, the following effects are expected. As quantitative effect, the following effects are expected.

- ① The annual amount of the fishery products, which is dealt in the Maputo Fish Market in accordance with the "Guidelines for Operation & Management of Maputo Public Markets, 2008", will increase from 0 tons to approximately 350 tons.
- ② The daily amount of the ice, which is possible to be bought in the Maputo Fish Market, will increase from 0 tons to approximately 2 tons.
- ③ The daily number of the retailers, who can engage their business in an appropriate job circumstances in the Maputo Fish Market, will increase from 0 to 100.
- ④ The number of the cars, which are parked regally by the persons visiting to the Maputo Fish Market, will increase from 0 to 38.

As qualitative effect, the following effects are expected.

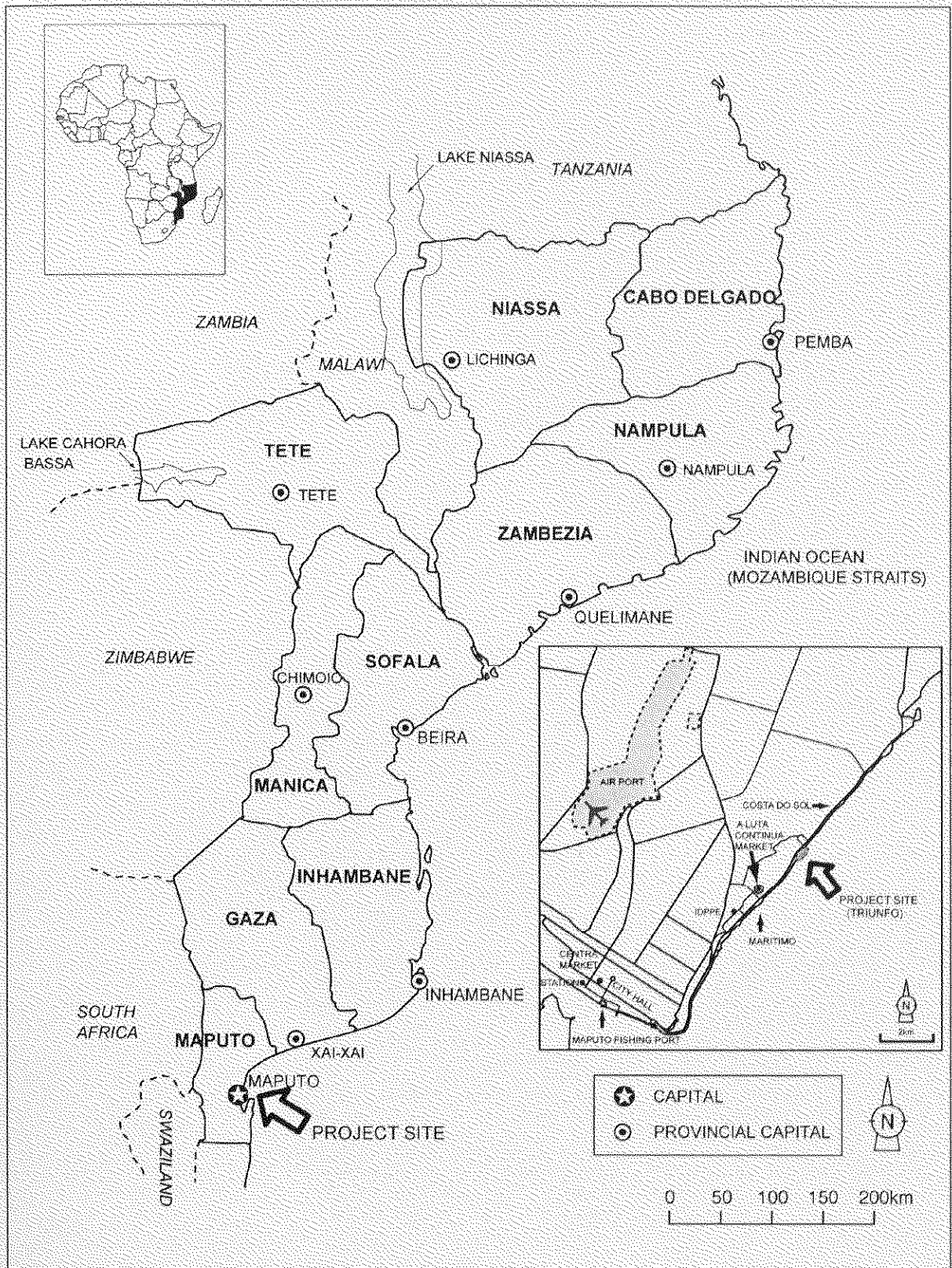
- ① The public fish market, which would satisfy the conditions for the Group A (the public market category where the market infrastructures such as ceiling provision, pavement, water & electricity supply, car parking provision, etc. are basically arranged) and would fulfil “Guidelines for Operation & Management of Maputo Public Markets, 2008”, is realized.
- ② It will become possible to provide more hygienic and qualified retail transactions of the fishery products to users of approx. 310 thousand persons annually.
- ③ With regard to the operation and maintenance of the Maputo Fish Market, the management of usage charge collection & accounting and the operation & maintenance of the ice making plant, chilled room and the emergency generator are conducted adequately.

In consideration of the above-mentioned points, it is considered as proper to implement the Japanese Assistance of this Project by means of Japanese grant aid cooperation.

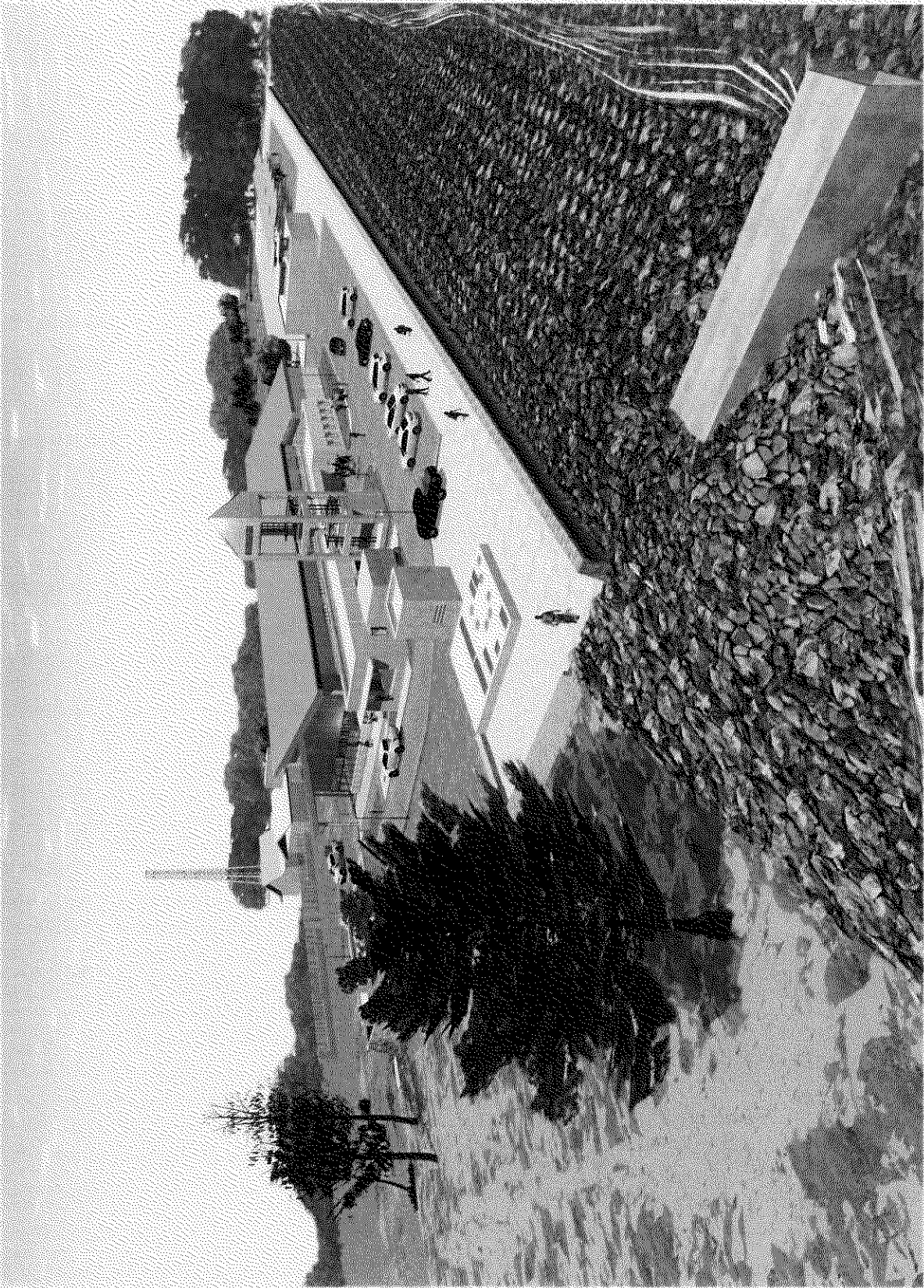
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Abbreviations

Abbreviation	Formal Name
AEP	Acrylic Emulsion Paint
C.D.L	Chart Datum Line
EIA	Environmental Impact Assessment
EIU	Economist Intelligence Unit
EP	Emulsion Paint
GL	Ground Level
GNI	Gross National Income
H.H.W.L	Highest High Water Level
H.W.L	High Water Level
IDPPE	National Institute for the Development of Small Scale Fisheries
KVA	Kilo Volt Ampere
L.W.L	Low Water Level
MICOA	Ministry of Coordination and Environment Affairs
M.S.L	Mean Sea Water Level
Mt	Meticaïs
RC	Reinforced Concrete
SER	Simplified Environmental Impact Assessment
VP	Vinyl Paint

Chapter 1 Background of the Project

Chapter 1 Background of the Project

1-1 Background

The Government of the Republic of Mozambique (hereinafter referred to as “Mozambique”) attaches importance to the artisanal fisheries development which aims at the improvement of the quality of life of the poor society. In this context, the Strategic Plan for Artisanal Fisheries Development (2007-2011) aims at the improvement of the quality of life of the artisanal fishermen and the development of the fisheries infrastructures including fish markets has been promoted. A Luta Continua Market, where the fresh fishery products from artisanal fisheries are marketed exclusively, is a sole public market where the fresh fishery products are marketed exclusively in the Maputo city. This market provides a place not only for buying fresh fishery products but also for tasting seafood dishes for the citizens of the Maputo city. However, at A Luta Continua Market, which is categorized in the Group C (market category as lack of realization of the market infrastructures such as ceiling provision, pavement, water & electricity supply, car parking provision, etc.) of the Maputo public markets, it becomes a big problem that this market does not satisfy the “Guidelines for Operation & Management of Maputo Public Markets, 2008” which must be satisfied by the operation and management of the market, where the fresh fishery products are dealt, in the Maputo city.

Under such circumstances, the Government of Mozambique requested in 2008 grant aid cooperation from the Japanese government with aiming at the promotion of fisheries development through the promotion of hygienic dealings of the fishery products and with the contents of the improvement of the public fish market in place of A Luta Continua Market which has many bottlenecks in the circumstances as the market. In response to this request, Japan International Cooperation Agency (hereinafter referred to as “JICA”) conducted the Preparatory Survey for Program for Rural Development and Continuous Economic Development (Fisheries Sector) from May, 2007 in order to confirm the status of the fisheries sector in the Project site and in Mozambique and to examine the propriety of the contents of the request. Though the above-mentioned status of the fisheries and the contents of the request were confirmed, the following bottlenecks remained unsolved.

- ① The explanation of the contents of the Project to the relevant stakeholders was not yet held and the establishment of the relevant mutual agreement is not clear.
- ② It was not confirmed which was the implementation body for the Project, the National Institute for the Development of Small Scale Fisheries (the body of requesting a grant aid cooperation, hereinafter referred to as “IDPPE”) or the Maputo City Administration (the body of operation of the market to be constructed).
- ③ As the area of Triunfo in the Maputo city was proposed as a substitute site for the original site which was considered as unsuitable, this was not yet confirmed officially.

In response to such circumstances, JICA conducted the Preparatory Survey (part 1) for Construction of Maputo Fish Market from January, 2010 and examined the necessity, propriety and urgency as a project for a grant aid assistance in the fisheries sector, examined the appropriate scope and scale of that assistance, collected the necessary information to confirm the propriety for implementation of the preparatory survey for outline designing, and confirmed the followings with regard to the above-mentioned bottlenecks.

- ① As the relevant stakeholders meeting was held during the survey period of this survey with being hosted by the Mozambique side, the market removal plan including the removal site was agreed mutually.
- ② It was confirmed that the responsibility agent is the Ministry of Fisheries, both IDPPE and the Maputo City Administration are designated as the implementation agency, and the

operation agency after completion of construction the fish market is the Maputo City Administration.

- ③ It was confirmed in the concerned Minutes of Discussions that Triunfo is the official Project site and also the drawing showing borderlines of the Project site and the permission document for construction of the new fish market were confirmed.

On the other hand, in the Preparatory Survey (part 1), the reporting of the activities of the market removal committee with regard to the removal of A Luta Continua Market and its decisions and the submission of the operation & maintenance plan for the new fish market from the Mozambique side were considered to be necessary before initiating Preparatory Survey (part 2). As the completion of these matters were confirmed, JICA decided to dispatch the Preparatory Survey (part 2 : Outline Design Study) for outline designing.

1-2 Natural Conditions

Mozambique has a total population of 22.89 million (source: the World Bank, as of FY2009) and consists of a total land area of 799,000km². Mozambique is located between approximate 10 degrees 27 minutes south latitude and approximate 26 degrees 52 minutes south latitude in the eastern area of the African Continent. As Mozambique faces the Madagascar Straits and also a warm current of the Mozambique Current comes from the Indian Ocean, the climate is relatively mild with the relatively less difference between hot and cold. The climate is divided into the rain season (October to March) and the dry season (April to September).

The capital Maputo city, where the Project site is located as the target region of the Project, is located in the high latitude close to South Africa and belongs the subtropical climate zone. The Maputo city has a total population of 1,888,000 (source: EIU, as of FY2010). In the Maputo city, the annual rainfall in average is approximately 644 mm, the average temperature is approximately 23.8°C, the average high temperature is approximately 28.7°C, the average low temperature is approximately 19.1°C and the average moisture during the year is approximately 69.9 %. As this city faces to sea, the daily difference of the temperature is generally small in comparison with that in the inland area. The erosion on the Eastern seashore in the Maputo city is remarkably.

1-3 Environmental and Social Considerations

(1) JICA's Environmental and Social Considerations Category

Some negative impacts as described below are anticipated. However, they are not serious but minor, thus the Project's Environmental and Social Considerations Category is thought to be "B" based on the JICA's guideline for Environmental and Social Considerations.

(2) Anticipated Negative Impacts

Negative impacts on the following aspects of both environmental and social factors will be caused by the implementation of the Project.

- ① By the Japanese Assistance, though the construction of new retailer's sales space will be conducted, the construction of the cooking services shops, groceries shops and small stores, which are operated outside of the existing fish market, will not be conducted. Then, some negative economical impacts on the people who run cooking services shops, groceries shops and the small stores will be caused when these people shift to the new fish market.

- ② Organic and non organic wastes such as fish guts, gills, and scales generated by the fish processing, kitchen refuse and left over, glass bins, cans, etc. will be generated. As a result they will cause offensive odor. Besides these wastes, upon the construction of the new fish market, some non organic wastes such as construction materials including some concrete blocks and irons will be generated.
- ③ In the Preparatory Survey (Part 1), negative impacts were predicted on nature environment such as marine ecosystem and shore erosion caused by the construction process of the new fish market and the constructed facilities. In the Preparatory Survey (Part 2), sea grass beds are not found within 200m from the shoreline of high tide during spring tide, thus the construction process will not likely to cause some negative impacts on sea grass. Furthermore, mangrove found approximately 2km from the Project site will be unlikely negatively affected. However, approximately 70 trees flourish within the Project site and some of them will be felling down and thus affect the landscape of the surrounded area and enhance shore erosion.
- ④ Sewerage water, which is generated by the toilets which will be installed at the new fish market, and fish processing will cause sea water contamination around the Project site. Tap water service network is available around the Project site and almost all the households are receiving the service, and underground water is unlikely to be used by the households, thus the sewerage water generated by the implementation of the Project is unlikely to affect local people's health.
- ⑤ The Project site is surrounded by the local people's residential area, some bars and restaurants, thus accidents may happen to the local people during the construction period of the Project's new fish market.
- ⑥ During the construction period of the Project's new fish market, air pollutants will be generated and thus cause air pollution.
- ⑦ During the construction period of the Project's new fish market, noise and vibration will be generated.

(3) Mitigation Measures for the Predicted Negative Impacts

To mitigate the predicted negative impacts on the environment and social aspects, the following measures are planned.

- ① The Maputo City Administration identifies the existing shops with freezers, grocery stores, cooking service shops and the stores located outside of A Luta Continua Market, as entitle to receive compensation for the shifting to the new fish market. For the contents of the compensation, the Maputo City Administration will construct shops, which have floors, ceilings and cooking facilities with some spaces for installing refrigerators, for the people running cooking services. Besides constructing these shops, the Maputo City Administration will pay the necessary expenses for the shifting. As for the required financial arrangement for this action, the Maputo City Administration has already discussed with its mayor. Maputo City's annual budget is draught in April ahead of the next year's budget plans and by September the next year's budget plans are summarized.
- ② The new fish market will have a garbage storing facilities which accommodates organic wastes such as fish guts and other organic residuals generated from the fish processing and cooking services shops' left over as well as non organic wastes such as glass bins, cans and used papers. Some private entities specializing this kind of job will handle the garbage collections. However, the expenses of the collection of the garbage will amount to a larger sum, thus an effort of reducing the total volume of the garbage will be made by promoting recycling and negotiating the expenses with the private entities to reduce the expenses. Industrial wastes generated from the construction process of the new fish market can be carried to the designated area outside of the city area with free of charge.

- ③ Coastal erosion as an environmental impact, which may be caused by the structural design of the new fish market, will be mitigated by embankment protection works.
- ④ Felling trees, which is inevitable within the Project site, will be minimized.
- ⑤ The public toilets, which are connected to the sewage disposal facilities, will be installed in the new fish market. The sewage disposal facilities will have enough capacity to treat both sewerages from toilets and general sewerage water. The sewerage water will be germicide with chlorine then it will permeate into the ground. The Maputo city supplies tap water almost all the household around the Project site thus the sewerage water permeated into the ground will have negligible health hazardous impacts. Nevertheless, it is important to carry out regular sea water sampling for a certain period of time upon the completion of constructing the new fish market because people enjoy swimming in the sea around the Project site.
- ⑥ There are restaurants, bars and residential houses around the Project site thus it is crucial to sensitize the local people for traffic safety as well as educate the people who are truck drivers, machinery operators and traffic control to prevent traffic accidents.
- ⑦ Watering as well as installing sheets during the construction period to mitigate air pollutants generated from the construction works.

(4) Procedure of Environmental Requirements

The followings are the environmental requirements set by the Government of Mozambique.

- ① The Government of Mozambique has environmental laws and requires all the development projects in Mozambique to have environmental licenses issued by MICOA. The Government of Mozambique has environmental categories, which are category A, category B and category C given by MICOA depending on the degree of adverse environmental and social impacts. There are no clear standards to categorize projects for construction of fish market. Based on the fact that a development projects which locate within 100m from the shoreline, which is categorized as protected areas, is sorted as category "A", the Project is likely to be categorized as "A" because of the Project site locates within 100m from the shoreline. However, the Project's environmental category will be given by MICOA after the submission of the required form filled by IDPPE, thus it is not clear for the Project's environmental category at this stage.
- ② As of April, 2011, IDPPE commenced the official procedures of environmental category and a required environmental license and is waiting the result of judging the environmental category. When the Project is categorized as "A" then IDPPE will prepare the EIA procedure, or when the Project is categorized as "B then IDPPE will prepare the SER (Simplified Environmental Impact Assessment Report).

Chapter 2 Contents of the Project

Chapter 2 Contents of the Project

2-1 Basic Concept of the Project

The Government of Mozambique attaches importance to the artisanal fisheries development which aims at the improvement of the quality of life of the poor society. In this context, the Strategic Plan for Artisanal Fisheries Development (2007-2011), which was made in 2007, aims at the improvement of the quality of life of the artisanal fishermen, and the development of the fisheries infrastructures including fish markets has been promoted.

Around the Maputo city of the Project target area, A Luta Continua Market is a sole public market, where the fishery products are marketed exclusively. In this market, the first class & the second class fish and crustaceans are retailed to general consumers and business consumers such as restaurants, and about 40 % of the amount of the fishery products dealt there are sold as the style of cooking services by the cooking services shops there. This market provides a place not only for buying fresh fishery products but also for tasting seafood dishes for the citizens of the Maputo city. And the products dealt in this fish market are mainly supplied by the artisanal fisheries.

As A Luta Continua Market is spontaneous facilities for fresh fish marketing in the present place, which was offered by the Maputo city's administration in 1986 to the street retailers through regulation process against street retailing activities of the fishery products, and the commercial cooking services has been developed there from meals services to the fish retailers. Under those situations, the market infrastructures such as ceiling provision, pavement, water & electricity supply, car parking provision and storage arrangement have not been realized intentionally. The Maputo City Administration demarcates the public markets into the Group A (the market infrastructures are well developed), the Group B (the market infrastructures are developed but not yet enough) and the Group C (the market infrastructures are not yet developed) with depending on the grade of development of the market infrastructures shown above and in accordance with the "Guidelines for Operation & Management of Maputo Public Markets, 2008". A Luta Continua Market is categorized in the Group C. Furthermore, it becomes a big problem that A Luta Continua Market does not satisfy the following important guidelines instructed in these guidelines and the hygienic conditions there are necessary to be improved.

- ① The retailing, storage and primary processing of the fishery products must not be conducted in the place which is suffered directly by sunshine & rainfall and /or contacted directly to factories, chemical gas, dusts, floating goods and rats.
- ② The fresh fish, its fillets and fishery products to be retailed in the next day must be stored in the storage of the adequate temperature or kept in the condition of mixture of ice.
- ③ The scaling and gutting of the fish must be conducted at the specified retail counter or at the exclusive place.

This Project aims at solving the above-mentioned problem in order to improve the hygienic conditions of the fresh fishery products marketed in the target area of the Project and also to re-establish the retail functions of fresh fishery products and the cooking services functions. For this purpose, this Project has an object to establish the fish market, its relative facilities, cooking services facilities and ice-supply system, which would satisfy the conditions for the category of Group A (the public market category where the market infrastructures such as ceiling provision, pavement, water & electricity supply, car parking provision, etc. are basically arranged) at the market removal site. Furthermore, as the fishery products dealt in this fish market are mainly supplied by the artisanal fisheries, this Project was planned at the standpoint of the development of artisanal fisheries. The Project site is the area of Triunfo in the Maputo city in the Maputo Province.

This Project is intended to establish the fish market, its relative facilities, cooking services

facilities and ice-supply system in order to achieve the above-mentioned object and to operate these facilities continuously. Through this Project, it will be expected to increase the quantity of the fishery products, which are dealt without direct influence by sunshine and rainfall, to improve the procedures of the preservation of the fishery products and increase the amount of ice supply for fish marketing. In this context, the Japanese Assistance, by means of grant aid cooperation, would realise the construction of Retail Booths, Administration Office, Chilled Room, Stock Room for Chest-freezers and Ice making Plant of the Fish Market, Car Parking, Garbage Storage Building, Public & Staff Toilets, Foodcourt, Sewage Disposal Facilities, Power Substation and Elevated Water Tank and procures the market equipment such as insulated fish boxes, scales, etc.

2-2 Outline Design of the Japanese Assistance

2-2-1 Design Policy

2-2-1-1 Basic Policy

(1) Basic policy

In preparing the Outline Design of the Japanese Assistance for this Project, the followings have been defined as the elements comprised in this basic policy:

- ① At the market removal site (Project site) which is prepared by the Mozambique side, the substitute fish market (hereinafter referred to as "Maputo Fish Market") is intended to be established in place of A Luta Continua Market which would be closed.
- ② The grade of improving Maputo Fish Market (the substitute market) will be equivalent to the conditions for the Group A categorized in the public markets in the Maputo city.
- ③ Due consideration should be given to the demarcation in site utilization between the construction site for the facilities of the Japanese Assistance and the construction site for the compensation facilities by the Mozambique side for the cooking services shops.
- ④ The findings of the natural conditions survey around the Project site will be reflected in the Outline Design.
- ⑤ Due consideration should be given to ease of maintenance and lower cost of operation of the planned facilities.

(2) Policy related to natural conditions

As the Maputo Fish Market faces to the Mozambique Straits, the following factors are paid attention on:

- ① For the selection of the building layout and the materials for finishing, due consideration should be given to the sea breeze contained with salt.
- ② The facilities layout with considering the outbreak of the surge caused by the abnormal weather, is adopted.
- ③ The design floor level of the facilities with supposing heavy rain and a flood, should be paid attention to.
- ④ The shape of the facilities should be examined with considering that the prevailing wind direction of the sea breeze at the Project site is from north-east to south-east.

Table 2-1 shows the designed values for the planned facilities with respect to natural conditions based on the findings of the natural conditions survey.

Table 2-1 Designed Values Concerning the Natural Conditions for Facilities Design

Item	Relevant natural conditions (data during the past ten years)	Designed values
Wind pressure	Average wind velocity during the year is 3.5m/sec., average maximum wind velocity during the year is 6.5m/sec., the sea breeze of 10-15m/sec. often runs in the afternoon at the Project site, the biggest wind velocity during the period is 30.9m/sec. (December, 2001) and the cyclones with the wind velocity 40-50m/sec. passed in the Mozambique Straits.	Maximum wind velocity: 40m/sec.
Precipitation	Average amount of annual rainfall is 644 mm, the maximum amount of annual rainfall is 1,305 mm, the minimum amount of annual rainfall is 245 mm and the maximum amount of daily rainfall is 450 mm (September, 1995). By adopting 10 years precipitation probability and 10 minutes rainfall intensity.	Maximum Precipitation: 206mm/hour
Temperature	Average temperature during the year is 23.8°C, average maximum temperature is 28.7°C and the highest temperature is 43°C (October, 2004).	Temperature in the open air: 34.3C
Moisture	Average moisture during the year is 69.9 %.	Design Moisture: 62 %
Tide level	H.H.W.L. is +2.0 m, H.W.L. is +1.6 m, M.S.L. is 0.0 m and L.W.L. is -1.6 m.	Same as the data of the natural conditions
Seismic force	No record	Horizontal seismic coefficient: 0
Bearing capacity of soil	1st layer: medium to fine sand (1-2m depth), N-value 10-20 2 nd layer: coarse to medium sand (3-4m depth), N-value 20-40 3 rd layer: silt (about 1.5 m depth), N-value 2-3 4 th layer: coarse sand (4-5m depth), N-value 20-40	N value: 15 and 17

(3) Policy related to socio-economic conditions

The policy related to socio-economic conditions with respect to this Project is as follows:

- ① In view of the fact that the sales of the products at the markets is the major source of cash income for retailers, the layout will be planned to provide larger sales space to retailers.
- ② The scheme of construction will be arranged for affecting the sales activities of the retailers and the cooking services shops as little as possible.
- ③ The charges for the use of the market facilities should be set such that it does not become an excessive burden on retailers.
- ④ The opinion of users as well as the need for meeting the cost of maintaining the facilities should be taken into account when setting the price of ice and the charges for storing the products.

(4) Policy related to construction and material procurement

1) Design criteria

As there are the town planning law and the building act & regulations in Mozambique, the

detail designing and construction supervision will be conducted in accordance with those local regulations. With regard to construction permission, the necessary documents should be submitted to the Maputo City Administration, then the matters concerning fire preventive, refuse treatment, etc. are examined side by side during the examination on the construction permission. With regard to design criteria, though there are relevant standards in Mozambique, the Japanese relevant standards are adopted with considering the international situation of consolidation of the standards.

Table 2-2 Design Criteria for the Project Facilities

Item	Governing criteria
Building	Building Act and Regulations of Mozambique and Building Standard Law (Japan)
Structure	Building Standard Law (Japan) and Structure Design Criteria stipulated by the Architectural Institute of Japan
Equipment	Building Act and Regulations of Mozambique and Building Standard Law (Japan)
Marine structure	Engineering Criteria for Harbor Facilities (and its explanatory book), and Design Guideline for Fishery Harbor/Bank Facilities 2003 (Japan)

2) Procurement of construction materials

Basically construction materials for this Project should be procured locally. However, from the following reasons, the origins of construction materials such as deformed bars, steel frames for structure and steel fittings should be compared among Japan, Mozambique and its neighboring countries.

- ① With regard to deformed bars, the locally marketed products are relatively expensive.
- ② With regard to steel frames for structure, the locally marketed products limit their specifications.
- ③ With regard to steel fittings, the products of appropriate quality are not marketed locally.

(5) Policy related to use of local construction companies

The execution scheme will meet the specifications and construction methods generally accepted in Mozambique so that local construction companies can properly participate in this Project.

(6) Policy related to operation, management and administration

The policy related to operation, management and administration is as follows:

1) Operation and maintenance

- ① The new Fish Market will be operated and maintained by drawing on Maputo City Administration's expertise accumulated from its long years' experience in running the public markets. However, the increase of the operation personnel and the partial changes in the operation system should be considered in order to operate the Ice Making Plant and Chilled Room, to reinforce hygienic management including waste processing and to ensure proper accounting control.
- ② To ensure the continuing operation of the Maputo Fish Market, due consideration should be given to its independence in terms of business accountability.
- ③ Recommendations on reserving budget for the future upgrading of the Ice Making Plant and the Chilled Room will be presented.

2) Soft Component

In view of the fact that there exist the following bottlenecks and/or conditions, the implementation of Soft Component is considered in association with the operation, maintenance and management of the planned Maputo Fish Market:

- ① The Mozambique side made a request for Soft Component in association with the operation, maintenance and management of the planned Maputo Fish Market.
 - ② At present, a large portion of market usage charges remain uncollected. In order to cope with this situation, some management guidance and support are necessary to realize appropriate accounting control.
 - ③ At present, garbage collection and disposal are not being properly executed. In order to cope with this situation, some operational guidance and support are necessary with respect to the enforcement of the relevant rules.
 - ④ With considering that the Mozambique side has not much experience for operation & maintenance of the Ice Making Plan and the Chilled Room, it is considered necessary to conduct some operational guidance and support with respect to the operation and maintenance of those facilities.
- (7) Policy related to setting the grade of facilities and equipment
- ① Due consideration should be given to the weather resistance and the salt water resistance, as the Project Site is located in the coastal zone facing the open sea.
 - ② Due consideration should be given to the ease of maintenance and the ease of hygienic management, as food sales facilities with considering the realities of the utilization of the similar facilities.
 - ③ Due consideration should be given to the harmony between the grade of the facilities and the surrounding facilities and scenery, as the Project site is located in the area of preservation woods in the coastal zone where provides a place for relaxation to the citizens of the Maputo city.
 - ④ The specifications of the equipment should be of a level of standard generally utilized in Mozambique.
- (8) Policy related to the construction method, procurement method and construction period
- ① With regard to the construction method, the standard method conducted locally should be adopted.
 - ② It should be planned to utilize the equipment operated locally with regard to the construction equipment.
 - ③ Due consideration should be given to the layout plan in order to minimize interference between the building construction and the civil construction.
 - ④ With regard to the procurement of the rocks for the Shore Protection, the construction period is planned with considering the necessary days from the cutting and transportation from the quarry.

2-2-1-2 Calculation of Size Requirements

(1) Number of the Retail Sections in the Retail Booth

1) Calculation policy

- ① The necessary scale of the Retail Sections is calculated by taking into account Mozambique's operation plans as well as the results of the marketing survey of A Luta Continua Market.
- ② The layout plan of the Retail Sections is determined by examining the present layout and taking the necessary improvements into consideration.
- ③ Due consideration should be given to the present style of utilizing jointly the Retail Sections of the Retail Booth.

2) Present situation of the Retail Sections of the Retail Booth

There are totally 64 sections for retailing in A Luta Continua Market and five to ten sections of similar fish species are connected in a style of booth and in the structure of table.

3) Present situation of the retailers

In accordance with the results of the survey on the persons targeted for compensation for market removal, there are totally 154 retailers who deal the products in A Luta Continua Market. 107 retailers of them are those who use exclusively the retail sections and the remaining 47 retailers use jointly the retail sections. The retailers of exclusive business are demarcated into 40 retailers of fish sales, 45 retailers of crustaceans (including vegetables) and 22 retailers of crab & shellfish sales. Table 2-3 shows the occupation ratio of the retail sections by fish species which is calculated from the situations of utilizing the sections by the retailers of exclusive business.

Table 2-3 Occupation Ratio of the Retail Sections by Fish Species

Fish species	Total retailers	Retail area: 2 m ²	Retail area: 1 m ²	Details unknown	Total area	Ratio against area
Fish	40	2	36	2	40 m ²	Aprox.32%
Crustaceans	45	26	10	9	62 m ²	Aprox.50%
Crab & Shellfish	22	3	17	2	23 m ²	Aprox.18%

Remark: With regard to retailers the retail area of whom is unknown, area is calculated as 0 m².

4) Daily number of the retailers who dealt the products during the survey period of the fish marketing survey at A Luta Continua Market

Daily number of the retailers who dealt the fishery products in this fish marketing survey (from March 22, 2011 to April, 11, 2011) are 52 retailers in average and 103 retailers in the maximum. On the other hand, as shown in Table 2-4, the monthly fluctuation index of the fish production around the Maputo area is 1.50 for March and 1.07 for April, then those months are the periods when the fish supply to the markets is relatively a lot. Therefore, the daily number of the retailers in the above-mentioned fish marketing survey is considered to represent the situations of the activities of the retailers in A Luta Continua Market.

Table 2-4 Monthly Fluctuation Index of the Fish Production around the Maputo Area

(unit: tons, but no unit for index)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.	Annual total
2005	551	597	455.2	106.6	225	138.1	225.8	74.1	49.1	40.6	55.9	72.8	2591.1
2007	245.8	286.3	232.9	123.2	319.8	328.2	360	192	100.8	166.7	369.8	276.8	3002.3
2008	181	475.7	299.6	287.6	351	225.7	184.4	91.8	56.5	114.8	101	87.4	2456.5

2009	318.5	296.4	464.3	507.5	569.7	397.2	501.3	429.1	301.7	240.5	273.8	192.2	4492.2
2010	255	342.7	691.9	495.6	377.5	654.5	238.1	233	217.9	254.9	273	550	4584.1
Total for 5 years	1551.3	1998.1	2143.9	1520.4	1843.0	1743.7	1509.6	1020.0	726.0	817.5	1073.5	1179.2	17126.2
Index	1.09	1.40	1.50	1.07	1.29	1.22	1.06	0.71	0.51	0.57	0.75	0.83	1427.2

Remarks 1) The index is calculated by dividing the monthly total for 5 years by the monthly average such as 1427.2 tons.

2) The index is calculated without using the data of 2006 due to those deviation.

5) Number of the Retail Sections of the Retail Booth in Maputo Fish Market (new substitution market)

With considering the above-mentioned situations, totally 100 Retail Sections are considered to be arranged. With regard to the allocation of the Retail Sections, 10 sections are allocated for crab sales, 10 sections for shellfish sales, 30 sections for fish sales, 40 sections for crustaceans sales and 10 Sections for common sales of crustaceans, vegetables and others. For the products other than fish, 10 Retail Sections are consolidated in the one Retail Booth. On the other hand, 6 Retail Sections are consolidated in the one Retail Booth for fish which is necessary to be treated by cutting sales & guts. Therefore, 1 Retail Booth is arranged for crab sales, 1 Retail Booth for shellfish sales, 5 Retail Booths for fish sales, 4 Retail Booths for crustaceans sales and 1 Retail Booth for common sales of crustaceans, vegetables and others. Then, totally 12 Retail Booths are arranged and some of the Retail Sections will be used jointly by the retailers.

(2) Quantity of the fishery products dealt in Maputo Fish Market

1) Calculation policy

- ① The quantity of the fishery products dealt is calculated by taking into account Mozambique's operation plans as well as the results of the marketing survey of A Luta Continua Market.
- ② The quantity of the fishery products dealt is calculated by taking into account the character of the sales cycle and the mechanism of the sales to the business consumers in the next day of materials procurement.

2) Sales cycle

The fishery products are sold to the general consumers (hand-carry purchase and consumption in the style of cooking services by individuals) and the business consumers such as restaurants, hotels, etc. in A Luta Continua Market. The fishery products procured around noon are first of all sold for the consumption in the style of cooking services during day & night and the hand-carry purchase in the afternoon. The remained products are stored during the night as the item for sales, and in the morning of the next day they are sold to the business consumers who want the food materials used from lunch menu. The ratio (next day sales ratio) of the amount of the next day sales against that of procurement is about 66% in average for all fish species. This is because that only at A Luta Continua Market the business consumers can procure the first class fish and crustaceans, which are preferably used by restaurants and hotels, in the morning time. Then, presently crustaceans is stored chillingly by ice and fish is stored with using the chest-freezers for next day sales during the night.

3) Next day sales ratio, next day sales reserve and total sales quantity by fish species

Data for the next day sales ratio by species are collected in ten days from March 22 to March 31, 2011 during the fish marketing survey as shown in Table 2-5.

Table 2-5 Next Day Sales Ratio by Fish Species at A Luta Continua Market

(unit : %)

	22/3	23/3	24/3	25/3	26/3	27/3	28/3	29/3	30/3	31/3
Fish	84	72	56	57	66	59	60	55	75	41
Crustaceans	34	61	72	49	54	68	57	77	57	60
Crab & Shellfish	65	47	94	25	56	73	71	84	66	90

Table 2-6, Table 2-7 and Table 2-8 show the daily sales quantities and the next day sales by fish species which are calculated with using the data in Table 2-5 and the data of fish procurement as results of the fish marketing survey.

Table 2-6 Quantities of Total Sales, Next Day Sales, etc. of Fish at A Luta Continua Market

(Unit : Kg)

Date	Stock in the previous day	Procurement amount on that day	Initial stock	Next day sales ratio	Total sales amount	Next day sales reserve
22 Mar.		904	904	0.84	145	759
23 Mar.	759	888	1647	0.72	461	1186
24 Mar.	1186	1413	2599	0.56	1144	1455
25 Mar.	1455	490	1945	0.57	837	1109
26 Mar.	1109	723	1832	0.66	623	1209
27 Mar.	1209	629	1838	0.59	754	1084
28 Mar.	1084	565	1649	0.6	660	990
29 Mar.	990	220	1210	0.55	544	665
30 Mar.	665	964	1629	0.75	407	1222
31 Mar.	1222	483	1705	0.41	1006	699
Average	1076	728	1696	0.63	658	1038

Remarks: The stock in the previous day is equal to the next day sales reserve when there is no reduction in storing. The initial stock is equal to the sum of the stock in the previous day and the procurement amount on that day as a limit of sales on that day.

Table 2-7 Quantities of Total Sales, Next Day Sales, etc. of Crustaceans at A Luta Continua Market

(Unit : Kg)

Date	Stock in the previous day	Procurement amount on that day	Initial stock	Next day sales ratio	Total sales amount	Next day sales reserve
22 Mar.		1267	1267	0.34	836	431
23 Mar.	431	515	946	0.61	369	577

24 Mar.	577	201	778	0.71	218	560
25 Mar.	560	91	651	0.49	332	319
26 Mar.	319	355	674	0.54	310	364
27 Mar.	364	353	717	0.68	229	488
28 Mar.	488	111	599	0.57	257	341
29 Mar.	341	257	598	0.77	138	461
30 Mar.	461	376	837	0.57	360	477
31 Mar.	477	501	978	0.6	391	587
Average		403	804	0.59	344	460

Remarks: The stock in the previous day is equal to the next day sales reserve when there is no reduction in storing. The initial stock is equal to the sum of the stock in the previous day and the procurement amount on that day as a limit of sales on that day.

**Table 2-8 Quantities of Total Sales, Next Day Sales, etc. of Crab & Shellfish
at A Luta Continua Market**

(Unit : Kg)

Date	Stock in the previous day	Procurement amount on that day	Initial stock	Next day sales ratio	Total sales amount	Next day sales reserve
22 Mar.		239	239	0.65	84	155
23 Mar.	155	265	420	0.47	223	198
24 Mar.	198	896	1094	0.94	66	1028
25 Mar.	1028	319	1347	0.25	1010	337
26 Mar.	337	259	596	0.56	262	334
27 Mar.	334	572	906	0.73	245	661
28 Mar.	661	165	826	0.71	240	587
29 Mar.	587	0	587	0.84	94	493
30 Mar.	493	239	732	0.66	249	483
31 Mar.	483	113	596	0.9	60	536
Average		307	734	0.67	253	481

Remarks: The stock in the previous day is equal to the next day sales reserve when there is no reduction in storing. The initial stock is equal to the sum of the stock in the previous day and the procurement amount on that day as a limit of sales on that day.

As shown in Table 2-6, Table 2-7 and Table 2-8, in March the average initial stock of fish (possible amount of daily sales) is 1,696 kg (the maximum initial stock: 2,599 kg) and the average next day sales reserve of fish is 1,038 kg (the maximum reserve: 1,455 kg). In March the average initial stock of crustaceans (possible amount of daily sales) is 804 kg (the maximum initial stock: 1,267 kg) and the average next day sales reserve of crustaceans is

460 kg (the maximum reserve: 587 kg). In March the average initial stock of crab & shellfish (possible amount of daily sales) is 734 kg (the maximum initial stock: 1,347 kg) and the average next day sales reserve of crab & shellfish is 481 kg (the maximum reserve: 1,028 kg).

4) Fluctuation adjustment

The amount of the fishery products in the market is likely to be influenced by the fluctuation of the fish production. As shown in Table 2-4, monthly fluctuation index of fish production at the fish landing places around the Maputo city (fish supply zone for this market) is 1.50 (meaning 50% more than the average) for March and 1.07 for April. Then, the April period is considered to represent the average situations. On the other hand, in accordance with results of fish marketing survey at A Luta Continua Market shown in the appendix, daily average procurement amount for all fish species in March is about 1,437 kg/day (14,373 kg ÷ 10days) and that in April is about 1,143.5 kg/day (12,579 kg ÷ 11days) during the survey period of March period (from March 22 to March 31) and April period (from April 1 to April 11). From these data the adjustment index from March period to April period is calculated as 1.26 (1,437 kg ÷ 1,143 kg). The representative figures are obtained with dividing the quantities of total sales and next day reserve shown in Table 2-6, Table 2-7 and Table 2-8 by the above adjustment index, 1.26.

(3) Determination of the scale of the major facilities

1) Ice Making Plant

- To fish procured on that day, ice is planned to be used in the ratio of 1 kg of ice to 1 kg of fish.
- To fish reserved for the next day sales, ice is planned to be used in the ratio of 0.5 kg of ice to 1 kg of fish (the necessary quantity of ice will become smaller because the fish is stored in the chest-freezer in the form of partial freezing in the night time).
- To crustaceans of the initial stock (procurement amount in that day + next day sales reserve), ice is planned to be used in the ratio of 1 kg of ice to 1 kg of crustaceans.
- To crustaceans chilled for the next day sales reserve, ice is planned to be used in the ratio of 0.5 kg of ice to 1 kg of crustaceans (the necessary quantity of ice is considered to be smaller because crustaceans is stored in the insulated fish box under 10°C in the Chilled Room)

Table 2-9 Demand of Ice in Maputo Fish Market (Unit : kg/day)

Target for ice supply	Calculated value	Adjusted value	Ice demand	Ice demand in the high demand month (March)
Fish procured on that day for sales	728	578	578	728
Fish reserved for the next day sales	1,038	824	412	519
Crustaceans of the initial stock for sales	804	638	638	804
Crustaceans chilled for the next day sales reserve	460	365	183	230
			1,811	2,281

Remarks: The calculated value is the daily average shown in Table 2-6, Table 2-7 and Table 2-8 and the adjusted value is calculated with dividing the calculated value by the adjustment index for March period, 1.26.

As the capacity of the small ice making machine is generally categorized by 500 kg range

for ice making capacity, the ice making machine of 1.5 tons/day capacity can not fulfill the above-mentioned ice demand. Then, the capacity of ice making is determined as 2 tons/day and the capacity of ice storage is determined as 8 tons. This ice storage volume is equivalent to the ice making volume of four days operation, that is a typical set-up of ice storage volume for this kind of the small machine. Furthermore, this ice storage volume will respond to the need of ice in the high demand month (March period) as about 8.4 tons ($(2,281 \text{ kg/day} - 2,000 \text{ kg/day}) \times 30 \text{ days}$).

2) Chilled Room

- The room temperature is determined as 10°C in consideration of easy operation & maintenance. Crustaceans are stored in the insulated fish with icing in the ratio of 0.5 kg of ice to 1 kg of crustaceans. With regard to the products which don't satisfy these storing conditions, the responsibility on the deterioration of quality during storing should be taken by the owner of the products.
- The ownership of the insulated fish box belongs to the operator of the Chilled Room as the efficiency of stacking the insulated fish boxes due to consolidation of the dimensions of those boxes. The users for the Chilled Room should pay the daily usage fee before the storing. The users should carry those insulated fish boxes with icing on the products at the designated time (three times in a day) and should take out those insulated fish boxes at the designated time (three times in a day) in the next day.
- To carry in and take out the insulated fish boxes is managed with using tickets and the users are allowed to lock their insulated fish boxes voluntarily.
- The storing target for the Chilled Room is crustaceans for the next day sales reserve. The products are planned to be stored in 40 boxes separately as the weight of individual box will be lightened. And individual storing in accordance with the difference of quality will be possible.

In consideration of the above-mentioned conditions;

- The daily storing demand is estimated as 365 kg (crustaceans for the next day sales reserve $460 \text{ kg} \div 1.26$).
- The daily storing volume per one insulated fish box in average is estimated as 13.7 kg ($(365 \text{ kg} + 183 \text{ kg ice}) \div 40 \text{ boxes}$). This weight will be possible to be stacked up and down by human strength.
- The specifications of the insulated fish box is determined as the box of 30 liters storing capacity ($13.7 \text{ kg} \div 0.8 \text{ the specific gravity of the products} \div 0.6 \text{ the space utilization efficiency of the box} = 28.5 \text{ liters}$).

3) Stock Room for Chest-Freezers

- As the fish for the next day sales reserve is customarily stored in the chest-freezer during the night time in A Luta Continua Market, the similar style of storing that fish is planned to be adopted by the Mozambique side.
- At present 20 chest-freezers owned by 19 retailers are used for this purpose. Some of these chest-freezers will be removed to Maputo Fish Market. However, there is an efficient situation in utilizing these chest-freezers, that is, the total storing capacity of these chest-freezers excess the actual demand of storing fish and should be too much. Then, the fish storing plan based on the efficient utilization of the chest-freezers will be considered and the joint utilization of the chest-freezers will be promoted for this plan. It is considered to be possible to utilize the same chest-freezer jointly by two owners of the products, as plural owners (two owners) sometimes store their products in the same chest-freezer at present. On the other hand, in order to store the products jointly and appropriately, the target storing volume is determined as average volume of fish for the

next day sales reserve in the high demand month (March period).

In consideration of the above-mentioned conditions;

- The daily storing demand is estimated as 1,038 kg (fish for the next day sales reserve in average in March period).
- The capacity of the chest-freezer typically used for this purpose is estimated as about 101 kg (volume 282 liters x 0.6 the stacking efficiency ratio x 0.6 the space utilization efficiency of the box)
- The necessary number of the Stock Room for Chest-Freezers is determined as 10 places ($1,038\text{kg} \div 101\text{ kg} = 10.27$).

4) Fish sales for cooking services and the relevant facilities

① Sales amount

Table 2-10 shows the sales amount for cooking services by calculation with using the utilization ratio (36%) for cooking services, which is obtained by the fish marketing survey at A Luta Continua Market, and using the total sales amount and their adjusted values calculated from Table 2-6, Table 2-7 and table 2-8.

Table 2-10 Sales Amount for Cooking Services

(Unit : kg/day)

	Calculated value	Adjusted value	Sales amount for cooking services	
			For calculated value	For adjusted value
Fish	658	522	237	188
Crustaceans	344	273	124	98
Crab & Shellfish	253	201	91	72
Total	1,255	996	452	358

Remarks: The calculated value is the daily average shown in Table 2-6, Table 2-7 and Table 2-8 and the adjusted value is calculated with dividing the calculated value by the adjustment index for March period, 1.26.

② Number of customers

As one customer is assumed to take 400 g of the fishery products in average in one cooking services, the average number of the customers to the market is estimated as about 895 persons per one day ($358\text{ kg} \div 400\text{ g/person} = 895$). As one visiting group is assumed to be organized with four persons in average, the daily number of the visiting groups of the customers is estimated as about 224 groups ($895\text{ persons} \div 4\text{ persons/group} = 223.8\text{ groups}$). In the similar assumption, in the high demand month (March period), the average number of the customers to the market is estimated as about 1,130 persons per one day ($452\text{ kg} \div 400\text{ g/person} = 1,130$). As one visiting group is assumed to be organized with four persons in average, the daily number of the visiting groups of the customers is estimated as about 283 groups ($1,130\text{ persons} \div 4\text{ persons/group} = 282.5\text{ groups}$).

③ Number of the services tables utilized

With considering that the services table is assumed to be utilized three times a day in average, that is, twice for lunch services (3 hours $\div$ 1.5 hours /usage from noon to 3 o'clock in the afternoon) and once for dinner services (3 hours $\div$ 2 hours /usage from 6 o'clock to 9 o'clock in the night), the capacity of the Foodcourt should respond to the space for 75 tables of 4 seats ($224\text{ groups} \div 3\text{ times/day} = 74.7$).

On the other hand, in the high demand month (March period), the services table is assumed to be utilized four times a day in average, that is, twice for lunch services (3 hours ÷ 1.5 hours /usage from noon to 3 o'clock in the afternoon) and twice for dinner services (4 hours ÷ 2 hours /usage from 6 o'clock to 10 o'clock in the night), the capacity of the Foodcourt should respond to the space for 72 tables of 4 seats (283 groups÷4 times/day =71.8). However, the space for 75 tables of 4 seats will satisfy this situation.

④ Number of cars parked

As the first class fish and Crustaceans are mainly dealt in this market and the cooking services are conducted concurrently, there are many family groups as customers. As the ratio of usage of the private car for visitation is considered to about 50 %, the car parking space for 38 cars is determined to be arranged as follows.

$$\bullet 74.7 \text{ groups/visiting cycle} \times 0.5 = 37.4$$

5) Garbage Storage Building

The daily amount of the garbage from raw materials brought by operation of these facilities is estimated as 337 kg in weight or 0.84 m³ in volume as shown in Table 2-11. In the existing market, there are incombustible garbage such as glassware and steel cans and paper garbage, which is brought from offices and cooking services shops as napkin, and the amount of these kinds of garbage becomes as similar as that of the garbage from raw material. Therefore, the daily amount of garbage brought by operation is estimated as 1.7 m³ in volume (0.84 + 0.84). As the garbage deposit container of 4 m³ capacity is installed outside of the existing market, the garbage deposit is collected by two or three days when that container becomes full by the deposit.

Table 2-11 Quantity of the Garbage from Raw Materials in Maputo Fish Market

Fish species	Retailing process			Process of cooking services		
	Calculated value	Deposit ratio (%)	Deposit amount (kg)	Calculated value	Deposit ratio (%)	Deposit amount (kg)
Fish	658	20	131.6	237	35	82.95
Crustaceans	344			124	55	68.2
Crab & Shellfish	253			91	60	54.6
Total	1,255		131.6	452		205.8

Remarks:

Amount of garbage from raw materials: $131.6 + 205.8 = 337.4 \text{ kg/day}$

Volume of that garbage $337.4 \div 0.4 = 843.375 \text{ liters}$

On the other hand, the Project site is located in the suburbs and outside the zone for periodical garbage collection in free charge. Therefore, it is necessary to entrust the companies with pay collection of garbage in the style of collection by individual garbage container (about 4 m³ volume at the price of 35 US\$/container). As the above-mentioned daily amount of garbage to be collected is lower than the capacity of this container, useless and much cost may be born in the case of entrusting with daily collection of garbage. Therefore, it is considered to be reasonable to store the garbage from raw materials for two days and gather them with the other garbage for ordering garbage collection once in two days.

Then, the system of garbage collection for this Project is that basically once in two days the garbage container is collected with placing another container at the place for garbage

container. It is necessary to arrange two places for garbage container. Furthermore, as the average open-air temperature and moisture are relatively high there, bad smell will be brought and bacteria will increase in the case of leaving the garbage from raw materials under the open-air temperature. Then, it is necessary to store the garbage from raw materials in the appropriate temperature and the stored temperature is determined as 15°C, which is a typical temperature adopted to the storage of food processing room.

6) Public Toilet Building

With regard to the Public Toilet Building, the Staff Toilet, where retailers and staffs of cooking services shops are target for usage, and the Public Toilet, where customers for cooking services shops are target for usage, are planned to be arranged concurrently. When these toilets are constructed separately, their maintenance will become troublesome. Then, these toilets are planned to be constructed jointly and their maintenance is lightened.

The target number for using the Staff Toilet is estimated as 200 persons a day with 100 retailers and 100 staffs of cooking services shops. The target number for using the Public Toilet is estimated as 300 person as 895 persons of the average number of the customers to the market are assumed to use toilets three turns in a day. The ratio of the sexes is considered to be even.

The necessary number of facilities is determined as follows in accordance with the level 3 (the level of waiting time of 120 seconds) in the waiting sequence method in the “the Guideline for Facilities for Water Supply & Drainage and Sanitary Equipment (issued as the technical report by the Academy of Air Conditioning and Sanitary Engineering in Japan).

Totally, for gentlemen 4 stools, 3 urinals and 3 washbasins are determined as necessary and for women 5 stools and 4 washbasins are determined as necessary. As the proportion between the customer user and the staff users is 3 against 2, the necessary number of facilities for each toilet is calculated as follows.

With regard to the Public Toilet, for gentlemen 2.4 stools, 1.8 urinals and 1.8 washbasins are calculated simply as necessary and for women 3 stools and 2.4 washbasins are calculated simply as necessary. With regard to the Staff Toilet, for gentlemen 1.6 stools, 1.2 urinals and 1.2 washbasins are calculated simply as necessary and for women 2 stools and 1.6 washbasins are calculated simply as necessary.

In consideration of determination of actual number of the equipment, with regard to the Public Toilet, for gentlemen 2 stools, 2 urinals and 2 washbasins are determined as necessary and for women 3 stools and 3 washbasins are determined as necessary. With regard to the Staff Toilet, for gentlemen 2 stools, 2 urinals and 2 washbasins are determined as necessary and for women 2 stools and 2 washbasins are determined as necessary. Furthermore, 2 shower rooms are determined to be arranged each for gentlemen room and women room of the Staff Toilet.

2-2-2 Basic Plan

2-2-2-1 Site and Facilities Layout Plan

In consideration of the current status of the site, the following site and facilities layout plan will be carried out:

1) Site and facilities layout plan

- ① The Retail Building will be constructed on the south-west side of the site and the facilities for the cooking services shops will be constructed on the north-east side of the site in order to harmonize the surrounding facilities.

- ② The Sewage Disposal Facilities and the Garbage Storage Building will be constructed on the corner of the south-west side of the site at the standpoint of the sanitation.
- ③ The culvert structure will be adopted to the facilities for the storm drain at the standpoint of the efficient utilization of the area of the site.
- ④ The overcoming waves from the seaside of the site should be considered in the facilities layout plan.
- ⑤ Traffic flow of the cars should be controlled as one way in the site because of clarifying the traffic line there.
- ⑥ The Retail Building will be planned in consideration of the utilization by the neighborhood.
- ⑦ The Public Toilet Building will be constructed on the coastal site in the central side of the site in consideration of the convenience of the target users.

2) Exterior plan

- ① The roadway and sidewalk on the premises will be paved. With regard to the roadway, the roadway for small cars and the parking area will be paved in the style of interlocking and the other space will be paved in the concrete paving.
- ② With regard to the drainage plan, the drain gutter will be installed at the inland side of the site and the drainage will flow out on the surface of slope of the Shore Protection, as the land surface in the site slopes down from the coastal side to the inland side. The land level of the site is slightly higher than those of the surrounding places. In order to prevent the rainwater coming in from the surrounding road and the extended place, the rainwater from the surrounding road including the drainage from the site will be flowed out through the culvert to the seaside by installing the catch basin on the corner of the south-west side of the site. The rainwater from each facilities will be gathered by the leaders into the catch basin and will be leaded to the drain gutter.
- ③ Though the edges of the site will be raised higher than the surrounding places, the connected slope between the edges and the surrounding places should be kept soft at the level of easy maintenance.

2-2-2-2 Architectural Plan

(1) Floor plan

1) Retail Building

With regard to the floor plan of the Retail Building, the following points are considered:

- ① The circulation of the customers and the circulations of the carrying the products into the site should be demarcated in consideration of the stocking of the products and the preparation of sales.
- ② Due consideration should be given to continuity with the section of the cooking services shops jointly located on the east side of the site.
- ③ More openings at the inland side and less openings at the seaside will be planned in order to soften the influence caused by wind.
- ④ The Retail Sections will be categorized in the similar products and gathered into the Retail Booth in order to respond to the circulation of the customers for purchase and to make it ease to compare the products.

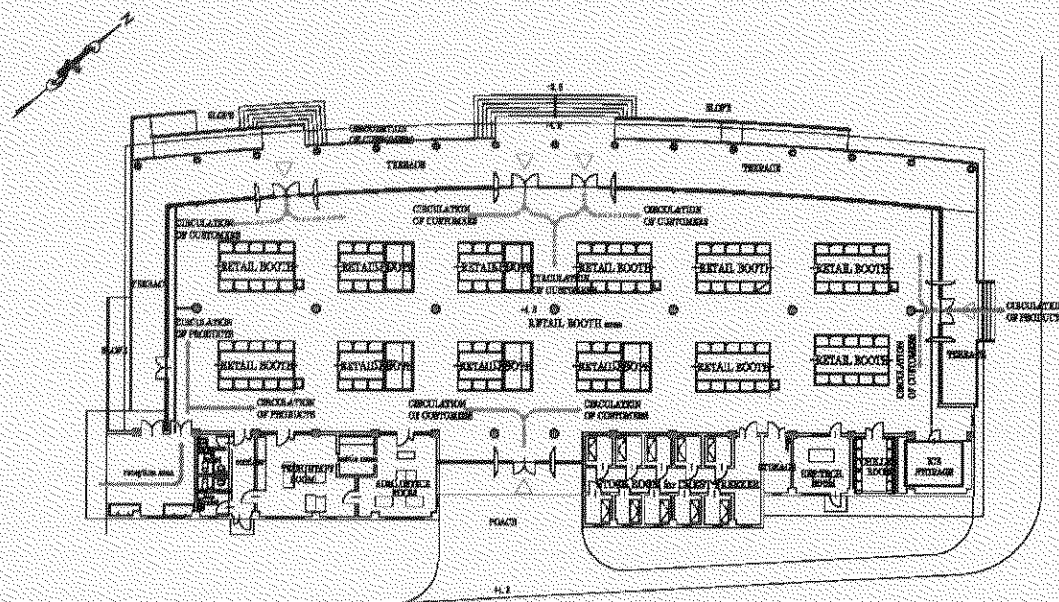


Figure 2-1 Floor Plan of the Retail Building

The Retail Sections in the Retail Building will be categorized in the similar products such as fish, crustaceans and crab & shellfish and be gathered into the Retail Booth. Concerning the sales style, the layout will be planned for the customers to be able to walk around the Retail Sections same as the present situations and the retailers will sell the products with standing back to back. The surface of the Retail Sections will be painted with epoxy resin because of direct contact with the products and be connected to the drainage through the trap. As rise portion of the reinforced concrete structure will be painted by acrylic emulsion paint, this will make dirt seen conspicuously and cause cleanliness. Furthermore, the space under the Retail Sections will be planned to be able to store the insulated box or the basin. As the drain gutter will be installed on the passage and the floor inside the Retail Booth, the wet conditions on the floor will be planned to be minimized.

①Retail Booth for general sales (for sales of crustaceans, crab & shellfish, etc.)

The table size of the Retail Sections will be designed as a frontage of 1.05 m and a depth of 0.85m. As the number of retailers in the Retail Booth is planned as 10 persons and the layout will be planned to let them face to the customers with standing back by back. The doorways will be planned to be installed at the both sides of the Retail Booth in order to allow the retailers freely go in & out at both sides. One washing basin will be installed outside the Retail Booth at the relatively low level in order to let the retailers or customers to wash the fishery products when necessary. Furthermore, the catch basin with a screening basket will be installed at center of the Retail Booth in order to make it easy for cleaning inside the Retail Booth.

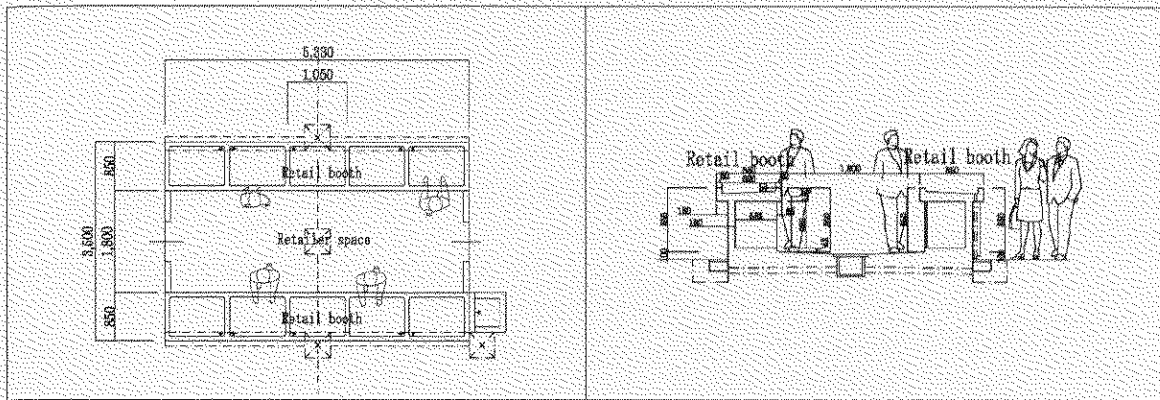


Figure 2-2 Retail Booth for General Sales

② Retail Booth for fish sales

The primary treatment space will be installed in the Retail Booth for fish sales in order to make the retailers possible to process fresh fish primarily by scaling, gutting and filleting. The number of retailers in the Retail Booth is planned as 6 persons. As two sets, as one set for 3 retailers, of the primarily treatment table will be installed in the Retail Booth, this will allow the continuous flow of treatment jobs such as washing, scaling, preparation, primarily treatment, packing, etc. The container for leavings by treatment will be installed under the table.

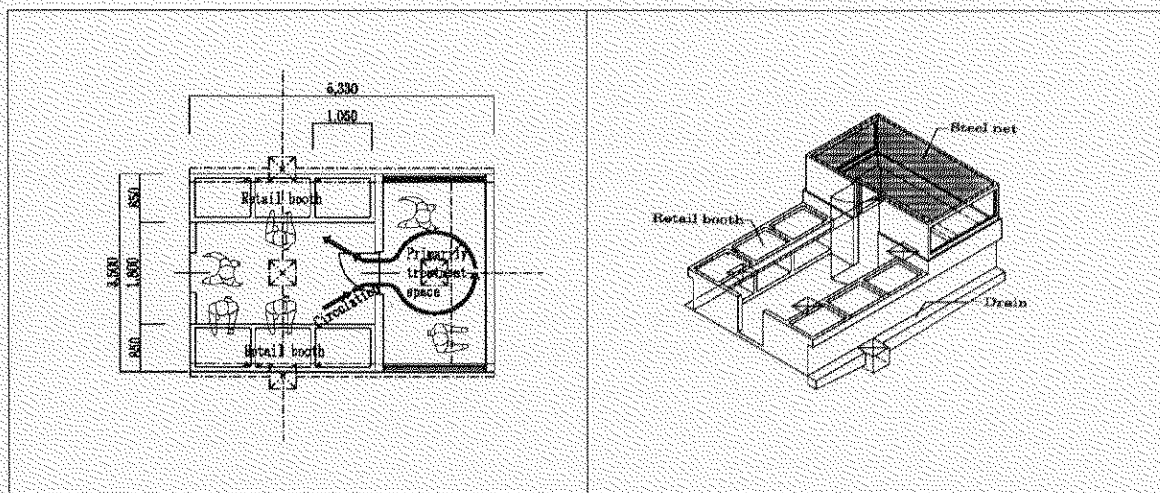


Figure 2-3 Retail Booth for Fish Sales and Primarily Treatment Flow

The primary treatment space will be planned as an enclosed style not for letting flies coming in and the ventilation and day-lighting will be secured by installing the steel net on the top side. The glassware window will be installed in order to let the customers to see the scenery of the primarily treatment from outside. The leavings by treatment will be packed in vinyl bags when reasonable amount and be stored in the storing shelves in the Garbage Storage Building.

③ Size of the rooms in the Retail Building

The determination of the size of the rooms in the Retail Building is conducted with referring to "standards for calculation of office space of newly constructed public buildings in Japan" and "compilation of materials for architectural design by Japanese Architectural Academy". And, with referring to the personnel conversion ratio for small local public

building shown in “standards for calculation of office space of newly constructed public buildings in Japan”, the conversion ratio for the Chief Inspector should be set up as 2.5 and that for other personnel as 1.0 in the operation of this fish market.

- Administration Office

As 1 Chief Inspector, 1 Secretary, 1 Financial Staff and 1 Accountant will use this room;

Business space $3.63 \text{ m}^2/\text{person} \times 2.5 \text{ (conversion ratio)} \times 1 \text{ person} + 3.63 \text{ m}^2/\text{person} \times 1 \text{ (conversion ratio)} \times 3 \text{ persons} = 19.965 \text{ m}^2$

Space for file lockers $1.2\text{m} \times 1.5\text{m} = 1.8 \text{ m}^2$

Space for accounting counter $1.2\text{m} \times 1\text{m} = 1.2 \text{ m}^2$

Passage space $(19.965 \text{ m}^2 + 1.8 \text{ m}^2 + 1.2 \text{ m}^2) \times 30\% = 6.890 \text{ m}^2$

As the total area of the above-mentioned space sums up as 29.86 m^2 , the size of the room is determined as 29.70 m^2 .

- Technical Staffs Room

1 Chief for Quality Control, 1 Chief for Hygienic Control and 1 Chief for Security Control are deemed to use the room usually. On the other hand, 6 staffs including Staff for Administration Cleaning & Management are counted as one staff in calculation because they use the room sometimes and especially 3 Security Staffs of them work by three shifts in a day, then ;

Business space $3.63 \text{ m}^2/\text{person} \times 1 \text{ (conversion ratio)} \times 3 \text{ persons} + 3.63 \text{ m}^2/\text{person} \times 1 \text{ (conversion ratio)} \times \text{for 1 person} = 14.59 \text{ m}^2$

Space for work $3\text{m} \times 2.1\text{m} = 6.3 \text{ m}^2$

Space for file lockers $5.4\text{m} \times 1.5\text{m} = 8.1 \text{ m}^2$

Passage space $(14.59 \text{ m}^2 + 6.3 \text{ m}^2 + 8.1 \text{ m}^2) \times 30\% = 8.697 \text{ m}^2$

As the total area of the above-mentioned space sums up as 37.69 m^2 , the size of the room is determined as 38.55 m^2 .

- Refrigeration Technicians Room

Though one exclusive desk is provided for 2 Refrigeration Engineers (working by two shifts in a day), one common working table is provided for 1 Electrician, 1 Staff for Ice Sales and 1 Staff for Chilled Room, then;

Business space $3.63 \text{ m}^2/\text{person} \times 1 \text{ (conversion ratio)} \times 1 \text{ person} = 3.63 \text{ m}^2$

Space for working table $1.8\text{m} \times 1.5\text{m} = 2.7 \text{ m}^2$

Space for file lockers $4.8\text{m} \times 1.5\text{m} = 7.2 \text{ m}^2$

Passage space $(3.63 \text{ m}^2 + 2.7 \text{ m}^2 + 7.2 \text{ m}^2) \times 30\% = 4.059 \text{ m}^2$

As the total area of the above-mentioned space sums up as 17.589 m^2 , the size of the room is determined as 17.64 m^2 .

- Ice Storage

The volume of 8 tons of ice is calculated as follows;

$$8 \div 0.36 = 22.2 \text{ m}^3$$

When the height of the stored ice is determined as 2m, the necessary area of the storage is calculated as follows;

$$22.2 \text{ m}^3 \div 2\text{m} = 11.1 \text{ m}^2$$

Therefore, the inside dimension of the Ice Storage is determined as $3.0\text{m} \times 4.0\text{m} = 12.00 \text{ m}^2$ and the installation area is determined, with considering the space for installation, as follows;

$$4.2\text{m} \times 5.2\text{m} = 21.84 \text{ m}^2$$

2) Public Toilet Building

Table 2-12 shows the number of the equipment and the necessary area for the Public Toilet. The stools for the Staff Toilet are determined as Turkish type and those for the Public Toilet as Western type.

Table 2-12 Floor Area for Public Toilet Building

Room	Number of equipment installed	Floor area
Gentlemen room of Public Toilet	Western type stool : 2, urinal : 2	23.6 m ²
Women room of Public Toilet	Western type stool : 3	19.7 m ²
Gentlemen room of Staff Toilet	Turkish type stool : 2, urinal : 2, shower booth : 2	23.8 m ²
Women room of Staff Toilet	Turkish type stool : 2, shower booth : 2	26.5 m ²

3) Garbage Storage Building

The garbage from raw materials for two to three days is stored under the cool temperature for restraining the increase of bacteria and smelling badly. Other than the Storage for Garbage from Raw Materials, Garbage Container Leaving Place and Washing Place for Garbage Bin are also planned to be arranged. As the type of the collection vehicle for the garbage container is a loader type and it carries an empty container when garbage collection, two places for Garbage Container Leaving Place are determined to be arranged.

4) Power Substation

The electric power is received in high voltage through the cable under the ground from the south-west edge of the site and distributed to each facilities after dropping voltage down by the transformer. The Power Substation is composed with Transformer Room, Distribution Room and Emergency Generator Room in accordance with the Standard for Electric Equipment & Facilities in Japan.

5) Water Reservoir and Elevated Water Tank

For fear of suspension of water supply, the stable water supply to each facilities in the site is planned by installing Water Reservoir and Elevated Water Tank. The capacity of Water Reservoir is determined as 32 tons (nominal capacity 40 tons), which is corresponding to daily usage, and the capacity of Elevated Water Tank is determined as 4 tons (nominal capacity 6 tons).

6) Foodcourt

The floor of Foodcourt is composed from continuous combination of rectangular plane units of 4.5 m side. As each rectangular plane unit is placed at the 45 degree against sea, due consideration should be paid to a fine views from each seats on the Foodcourt.

(2) Sectional plan

1) Retail Building

In consideration with sea breeze, the roof is planned in the gable style with a slope of 30 % to seaside direction and a slope of 20 % to inland side direction. Due to the gable roof,

preparation against the increase of temperature is considered by having a high space and enough air volume in the Retail Building. The day lighting and ventilation to inside are promoted by providing high side lighting made by glass louver at the cross point of the roofs. The average ceiling height is designed as 6 meters inside of the Retail Building and the story height in the administration zone at seaside and in the ice making zone is designed as 3 meters with considering space for installation of panels for Ice Storage. As the land is planned to be formed as sloping higher from inland side to seaside, the floor level of the Retail Building is determined as C.D.L. + 4.8 m in consideration of the level at the Car Parking at seaside and the approach area to inland side.

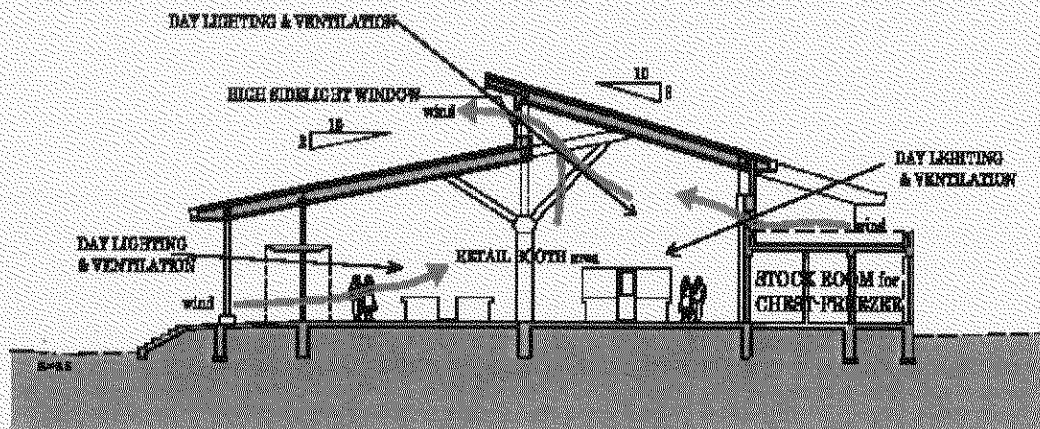


Figure 2-4 Sectional Plan for Retail Building

2) Public Toilet Building

In consideration with the height of apron of the Shore Protection, the floor level of the porch for this facilities is determined as C.D.L. + 4.85 m. In consideration with the drainage, the floor level at each toilet room is determined as 5 cm lower than the floor level of the porch. In consideration with keeping enough ceiling height in the toilet room, the story height is determined as 3.5 meters. The high side lighting is adopted to day-lighting, and the natural ventilation is promoted by using the glass louver.

3) Garbage Storage Building

The service deck is installed in order to facilitate throwing the garbage from raw materials into the garbage container and the height of the deck is determined in consideration of smooth going in & out. The story height of this facilities is determined as 3.5 meters.

4) Power Substation

The story height of this facilities is determined in accordance with the heights of the distribution panels installed in the Transformer Room and the emergency generator to be installed.

5) Water Reservoir and Elevated Water Tank

In order to secure enough water pressure for smooth supply to each facilities and the Ice Making Plant, the ground level of this facilities is determined as C.D.L. + 4.4 m and the elevation of the Elevated Water Tank is determined as 12.5 meters.

6) Foodcourt

In consideration with movement and maintenance of the view of the customers, the story height is determined as 2.7 meters. In consideration with diminishing the wind resistance as much as possible, the slope of the roof is determined as 30 % and the openings are installed in the center of each plane unit.

(3) Structural plan

With regard to the Retail Building, the gable end for the roof, the steel structure cum partly reinforced concrete structure for the main structure, concrete block construction for the wall and steel structure for the roof frame due to wide span, are adopted. With regard to the Public Toilet Building, the Power Substation and the Garbage Storage Building, the reinforced concrete & moment resisting frame structure and the concrete block construction for the wall, are adopted. The structural plan for each facilities is shown in Table 2-13. For the foundation structure, the spread foundation & footing is adopted for each facilities. Table 2-14 shows floor area of each facilities.

Table 2-13 Structural Plan

Name of Facilities	Total Floor Area (m ²)	Building Area (m ²)	Stories	Type of Structure	Framework
Retail Building	1,572.37	1,519.35	2	RC & Steel-frame structure	Rigid frame structure
Power Substation	60.0	60.0	1	RC structure	Rigid frame structure
Public Toilet Building	169.0	169.0	1	RC structure	Rigid frame structure
Garbage Storage Building	16.0	16.0	1	RC structure	Rigid frame structure
Foodcourt	494.14	494.14	1	Steel-frame structure	Rigid frame structure
Elevated Water Tank	26.0	26.0	3	RC structure	Rigid frame structure
Sewage Disposal Facilities : machine room	10.5	10.5	1	RC structure	Rigid frame structure

Table 2-14 Floor Area of Each Facilities

Name of Facilities	Story	Name of Room	Area (m ²)	Area Calculation
Retail Building			1572.27	
	First story		1,519.35	including the terrace area of 286.70 m ²
		Retail Booth area	949.78	17.4×54.6(circular)+2.1×2.1+10.5×2
		Ice Storage	21.84	5.2×4.2
		Chilled Room	13.44	3.2×4.2
		Refrigeration Technicians Room	17.64	4.2×4.2
		storage	8.82	2.1×4.2
		Stock Room for Chest-freezer	81.90	12.6×6.5
		reception area	37.87	6.3×6
		Administration Office	29.70	4.3×6+1.3×3
		Technical Staffs Room	38.55	5.75×6+1.35×3
		kettle room	7.95	2.65×3
		gentlemen toilet	7.20	2.4×3
		women toilet	7.20	2.4×3
		corridor	10.80	1.8×6
Power Substation	Second story		52.92	
		installation space for Ice Making Machine	52.92	12.6×4.2
			60.00	
Public Toilet Building	First story	Transformer Room	19.80	3.3×6 = 19.8
		Distribution Room	11.10	3.7×3 = 11.1
		Emergency Generator Room	18.00	3×6 = 18
			169.00	
	First story	reception space for usage tickets, porch and corridor	73.40	1.5×1.7+5.7×1.5+8×2+9.5×1.8+13×2.4—2
		Gentlemen Public Toilet	23.59	3.8×5.3+2.3×1.5
		Women Public Toilet	19.71	4.2×3.6+2.7×1.7
Garbage Storage Building		Gentlemen Staff Toilet	23.80	5×3.5+3.5×1.8
		Women Staff Toilet	26.50	5×5.3
		storage	2.00	2×1
Elevated Water Tank			16.00	
	First story	Storage for Garbage from Raw Materials	16.00	4×4
Sewage Disposal Facilities			26.00	
	First story	Pump Room	10.00	4×2.5
Foodcourt	Second story	installation space for Water Reservoir	16.00	4×4
	First story	machine room	10.50	3.5×3
Total floor area			494.14	
	First story	Foodcourt	494.14	
Total floor area			2,347.91	

(4) Refrigeration Facilities

1) Ice Making Machine

①Type of ice

The type of ice is determined as crushed type because its capability of cooling and suitability as ice for fish marketing.

②Refrigerant

Refrigerant R-404 is determined to be adopted as refrigerant for this machine because this refrigerant is often used for this kind of machine in the Maputo city.

③Type of compressor

Semi-hermetic type or open type compressor is determined to be adopted as compressor because of relatively easy maintenance and suitability for small plant.

④Condensing system

Air condensing system is determined to be adopted, because the air condensing system is relatively easier in maintenance rather than water condensing system and there are relatively much foreign matters in the well water.

2) Ice Storage

The prefabricated panel style is determined to be adopted because of easy installation. The air cooling unit is determined to be installed for diminishing melting loss of crushed ice.

Table 2-15 Specifications of Ice Storage

External size	Internal Dimension: 4.0mW x 3.2mD x 2.1mH
Material	Insulation panel core: Rigid polyurethane form 100mm Surface: Color coated steel sheet
Capacity	24 m ³
Air cooling unit	Set onto upper floor

3) Chilled Room

This facilities is a room for storing the insulated box contained with fresh shrimp and ice on. The insulated container is stored on the shelves under the inside temperature of 10°C. The insulation work for the Chilled Room is determined to be conducted by site work because the inside temperature is 10°C.

4) Storage for Garbage from Raw Materials

After the garbage from raw materials from the Retail Building and the cooking services shops are stored under the inside temperature of 15°C, it will be stowed into the garbage container when the container collection vehicle arrives. The inside temperature of the Storage for Garbage from Raw Materials is determined as 15°C. And its inside should be finished as capable for cleaning. And the garbage from raw materials will stored on shelves with being stocked in the bin with cover.

(5) Building equipment

1) Electric equipment

①Equipment for Power Substation

The electric power is led from the middle voltage electric line placed under ground at the opposite side over the Marginal road into the middle voltage panel in the Transformer Room

in the site through the electric line under ground. Works for leading electricity to the middle voltage panel in the Transformer Room should be conducted by the Mozambique side.

②Lighting installation

The illuminance for each room is determined to be adopted as follows. Fluorescent lamp fixture will be used for lighting and the cover will be supplied on necessity;.

Administration Office and Staffs Room	300 lux
Retail Building and Power Substation	200 lux
Toilets, storage, etc.	100 lux

③Receptacle

One or two receptacles will be installed in each room for cleaning purpose. The waterproof type will be supplied on necessity. As the necessary electric demand is calculated as follow, 250 KVA transformer will be installed;

· Calculation of electric demand

Lighting for Retail Building	1,500	(m2)	x	10	(w/m2)	=	15	(kw)
Air-conditioning for Retail Building	4	(units)	x			=	9.6	(kw)
Ice Making Machine						=	40	(kw)
Chilled Room and Garbage Storage	2		x	5	(kw)	=	10	(kw)
Water pump, etc. for Retail Building						=	10	(kw)
Stock Room for Chest-freezer	10	(rooms)	x	500	(w)	=	5	(kw)
Lighting for Toilets and exterior zone						=	5	(kw)
Lighting for cooking services shops	45	(rooms)	x	200	(w)	=	9	(kw)
Equipment for cooking services shops	45	(rooms)	x	1.5	(kw)	=	67.5	(kw)
Total					Appro.		200	(kw)

④Emergency generator

One emergency generator of 50 KVA capacity will be installed in order to secure the operation of the Water Reservoir, Sewage Disposal Facilities and Chilled Room when the electric current is cut off. The operation control for the emergency generator will be manual type and the operation control will be capable both in the Emergency Generator Room and the machine room for the Ice Making Plant.

⑤Other

With regard to the electric supply to the facilities concerning the cooking services shops, though the main supply line will be supplied by the Japanese side, the branch supply line will be supplied by the Mozambique side.

2) Plumbing system and sanitation installations

①Water supply system

The potable water is led from the main water supply line placed under ground at the opposite side over the Marginal road into the measurement gauge in the site by the

Mozambique side. The plumbing works for distribution in the site after the stop valve of the measurement gauge is conducted by the Japanese side.

As Water Reservoir and Elevated Water Tank are used in the water supply system, water is basically distributed to each facilities by gravity. With regard to water supply to the zone of the cooking services shops, the main water supply line is installed by the Japanese side but the branch water line and the measurement gauge for each facilities should be installed by the Mozambique side. As the water supply demand is estimated as follows, this amount is determined as capacity for daily supply of Water Reservoir.

Calculation of Water Demand

Floor washing for Retail Building	1,500	(m2)	x	2	(Lit/Day)	=	3,000	(Lit/Day)
Retail Booth washing	90	(units)	x	5	(Lit/Day)	=	450	(Lit/Day)
Primary processing table washing	5	(units)	x	500	(Lit/Day)	=	2,500	(Lit/Day)
Fishery products cleaning	2	(t)	x	3000	(Lit/Day)	=	6,000	(Lit/Day)
Ice Making Plant	1	(unit)	x	2500	(Lit/Day)	=	2,500	(Lit/Day)
Gentlemen Staffs Toilet	70	(persons)	x	3	(Lit/Day)	=	210	(Lit/Day)
Women Staffs Toilet	70	(persons)	x	10	(Lit/Day)	=	700	(Lit/Day)
Shower booths	50	(persons)	x	20	(Lit/Day)	=	1,000	(Lit/Day)
Gentlemen Public Toilet	450	(persons)	x	3	(Lit/Day)	=	1,350	(Lit/Day)
Women Public Toilet	450	(persons)	x	10	(Lit/Day)	=	4,500	(Lit/Day)
Zone for cooking services shops	45	(shops)	x	200	(Lit/Day)	=	9,000	(Lit/Day)
Total							31,210	(Lit/Day)

②Sanitation installations

Table 2-16 Sanitation Installations

Building	Room	Equipment
Retail Building	Gentlemen toilet	Western type stool, urinal, washbasin
	Women toilet	Western type stool, washbasin, sink
	Kettle room	faucet
	Retail booth	faucet
Public Toilet Building	Gentlemen Public Toilet	Western type stool, urinal, washbasin
	Women Public Toilet	Western type stool, washbasin, sink
	Gentlemen Staff Toilet	Turkish type stool, urinal, washbasin
	Women Staff Toilet	Turkish type stool, washbasin, sink
Garbage Storage Building	Storage for Garbage from Raw Materials	faucet
External Site		Bibcock for sprinkling

③Drainage system

The drainage from retailing activities, fish primary processing and cooking services will be disposed in the Sewage Disposal Facilities by aeration and will be percolated into the underground after sterilization. The rainwater on the roof will be led in the storm drain network through eaves gutters and leaders. As the drainage from the car parking area and the

road side is also led in the storm drain network through, this drainage will be finally discharged to sea through the culvert installed in the south-west edge of the site.

3) Air conditioning and ventilation facilities

The split type air conditioning equipments are installed in the Administration Office, Technical Staffs Room and Refrigeration Technicians Room.

With regard to mechanical ventilation, wall fitting type ventilation fan and intermediate duct type exhaust fan is installed for the Ice Sales Control Room, storages, Administration Office, Technical Staffs Room, kettle room, gentlemen toilet, women toilet, installation place for Ice Making Machine, Transformer Room, Distribution Room, Emergency Generator Room, Gentlemen Public Toilet, Women Public Toilet, Gentlemen Staffs Toilet, Women Staffs Toilet, Storage for Garbage from Row Materials, the room for the blower for aeration and Pump Room.

The natural ventilation will be adopted for the Retail Building by opening & closing the fittings.

(6) Finishing plan

The finishing for each facilities is determined as shown in Table 2-17 and Table 2-18 as the specifications which are able to be conducted by local standard techniques.

Table 2-17 Exterior Finish Schedule

Name of Facilities	Finishing
• Retail Building	Pitched roof; Epoxy-resin coated steel structure, Colored fluoric-resin galvanized folded metal t=0.6mm h=85mm, with insulation Flat roof; RC, Urethane liquid waterproofing Eaves ceiling; Calcium silicate board t=8.0mm External wall; 150mm concrete block, Acryl-resin paint, & Colored fluoric-resin coated galvanized folded metal t=0.6mm h=18mm with insulation Column; RC. Mortar, acryl-resin paint External windows and doors; Aluminum sash, aluminum doors, steel doors External skirting; RC, Silica permeable water repellent solvent Terrace; Mortar, Iron trowel finish, Epoxy-resin coat with color(non-slip finish) Steps; Mortar, Iron trowel finish, Epoxy-resin coat with color(non-slip finish) Nosing; Ceramic tile(non-slip type)
• Power Substation • Garbage Storage Building • Elevated Water Tank • Sewage Disposal Facilities-machine room	Flat roof; RC, Urethane liquid waterproofing (On Elevated Water Tank; Mortar reinforced by wire-mesh t=50mm) External wall; 150mm concrete block, Acryl-resin paint Column & beam; RC. Mortar, acryl-resin paint External windows and doors; Aluminum sash, aluminum doors, steel doors External skirting; RC, Silica permeable water repellent solvent Steps; Mortar, Iron trowel finish, Epoxy-resin hardener (non-slip finish)
Public Toilet Building	Flat roof; RC, Urethane liquid waterproofing External wall; 150mm concrete block, Acryl-resin paint Column & beam; RC. Mortar, acryl-resin paint External windows and doors; Aluminum sash, aluminum doors, steel doors External skirting; RC, Silica permeable water repellent solvent

Foodcourt	Pitched roof; Epoxy-resin coated steel structure, Colored fluoroc-resin galvanized metal t=0.6mm (Standing seam h=46mm), Asphalt felt, Insulation; Cement bonded wood-flaks board t=15mm Column; Epoxy-resin coated steel structure Floor; Interlocking block pavement t=60mm
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Table 2-18 Interior Finish Schedule

Name of Facilities	Name of Room	Finishing		
		Floor	Wall	Ceiling
Retail Building	• Retail Booth area • Booth space • Primarily treatment space • reception area	Mortar iron trowel finish, Epoxy-resin coat with color (non-slip finish) Skirting; Epoxy-resin coat with color h=100mm	RC, CB; Mortar, AEP Steel structure; Calcium silicate board t=8mm, AEP	Calcium silicate board t=8mm, AEP (Primarily treatment space; Stainless steel mesh)
	• Administration Office • Technical Staffs Room • Refrigeration Technicians Room • corridor	Mortar iron trowel finish, Epoxy-resin coat with color (non-slip finish) Skirting; Mortar AEP h=100mm	RC, CB; Mortar, AEP	Gypsum plaster board t=12mm EP (CH=2,700)
	Chilled Room	Water proofing sheet, Form styrene board t=100mm, RC with wire mesh t=100mm, Epoxy resin coat (non-slip finish) Skirting: Epoxy resin coat h=100mm	Water proofing sheet, Form styrene board t=100mm, Mortar with metal-lath, AEP	Water proofing sheet, Form styrene board t=100mm, Mortar with metal-lath, AEP
	Ice Storage (Settling space for a prefabricated ice storage)	Mortar iron trowel finish, Floor hardener, Skirting: Mortar h=100mm	Mortar	Mortar repairing
	Stock Room for Chest-freezer	Mortar iron trowel finish, Epoxy floor hardener (non-slip finish), Skirting: Mortar AEP h=100mm	Mortar	Mortar repairing AEP
	Storage	Mortar iron trowel finish, Floor hardener, Skirting: Mortar h=100mm	RC, CB;; Mortar	Exposed to roof soffit

	Kettle room	Mortar iron trowel finish, Epoxy-resin coat with color (non-slip finish) Skirting: Epoxy-resin coat with color h=100mm	RC, CB; Mortar, AEP	Fiber cement board t=6mm VP
	• gentlemen toilet • women toilet	Ceramics tile	Ceramics tile	Fiber cement board t=6mm VP
Power Substation	• Transformer Room • Distribution Room • Emergency Generator Room	Mortar iron trowel finish, Floor hardener, Skirting: Mortar h=100mm	RC, CB; Mortar, AEP	Cement bonded wooden fiber board t=25mm
Public Toilet Building	Reception space for usage ticket, porch and corridor	Ceramics tile (non-slip type) Skirting: Ceramics tile h=100mm	RC, CB; Mortar, AEP	Calcium silicate board t=8mm, AEP (CH=2,700)
	• Gentlemen Public Toilet • Women Public Toilet • Gentlemen Staff Toilet • Women Staff Toilet	Ceramics tile (non-slip type)	Ceramics tile	Fiber cement board t=6mm VP (CH=2,700)
	Storage	Mortar iron trowel finish, Floor hardener, Skirting: Mortar h=100mm	RC, CB; Mortar	Exposed to slab soffit
Garbage Storage Building	Storage for Garbage from Raw Materials	Water proofing sheet, Form styrene board t=100mm, RC with wire mesh t=100mm, Epoxy resin coat (non-slip finish) Skirting: Epoxy resin coat h=100mm	Water proofing sheet, Form styrene board t=100mm, Mortar with metal-lath, AEP	Water proofing sheet, Form styrene board t=100mm, Mortar with metal-lath, AEP
Sewage Disposal Facilities	Machine room	Mortar iron trowel finish, Floor hardener, Skirting: Mortar h=100mm	RC, CB; Mortar	Exposed to slab soffit
Elevated Water Tank	Pump Room	Mortar iron trowel finish, Floor hardener, Skirting: Mortar h=100mm	RC, CB; Mortar	Exposed to slab soffit

AEP: Acryl-resin paint, EP: Emulsion paint, VP: Vinyl paint

2-2-2-3 Civil Engineering Plan

(1) General plan

The purpose of civil engineering plan is to prevent shore erosion by ocean waves, to diminish the overcoming of the waves into the site and the dispersing of splashes and to lighten their influence to land facilities.

(2) Construction Plan

① Tidal height

The raise of water level will be considered with regard to H.H.W.L +2.00 meters.

② Design wave height

2.3 meters (eastern direction, as wave outside bay) is adopted as design wave height.

③ Upper surface height of Shore Protection

+6.00 meters is adopted in consideration of calculation of waves running up and surrounding facilities.

④ Subsidiary structure

Recurved parapet for diminishing the waves running up and the apron for maintenance works are planned as subsidiary structure.

⑤ Surplus soil

The surplus soil by civil works will be transported into the site and utilized as filling materials.

(3) Floor Plan

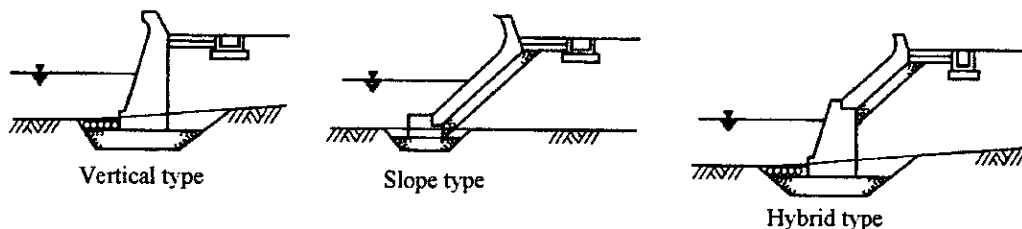
① The position of Shore Protection is planned not to have much influence on the change of the existing shorelines.

② The apron for maintenance is designed linearly possible for connecting easily with the circulation in the premises.

③ The layout will be planned for facilitating pedestrian access to surrounding area.

(4) Sectional Plan

① The slope type structure is adopted in consideration of less influence on the surrounding shorelines due to small reflected waves and its hydrophilic property. Because of usage of armor stones, it will be relatively easy for maintenance in the case that the facilities are damaged by abnormal waves.



② In consideration of implementation precedents in the surrounding facilities and landscape,

local stones will be utilized fundamentally.

- ③ The structure will be designed as having enough durability against shore erosion.
- ④ As the weight of armor stones is calculated as 0.76 tons by the below formula, the designed weight is determined as 1 ton.

$$W = \frac{\rho_r \rho_0^3 H^3}{K_D (\rho_r - \rho_w)^3 \cot \theta}$$

$$= 2.6 \times 1.03^3 \times 2.3^3 / 3.9 \times (2.6 - 1.03)^3 \times 3 = 0.76$$

Remarks:

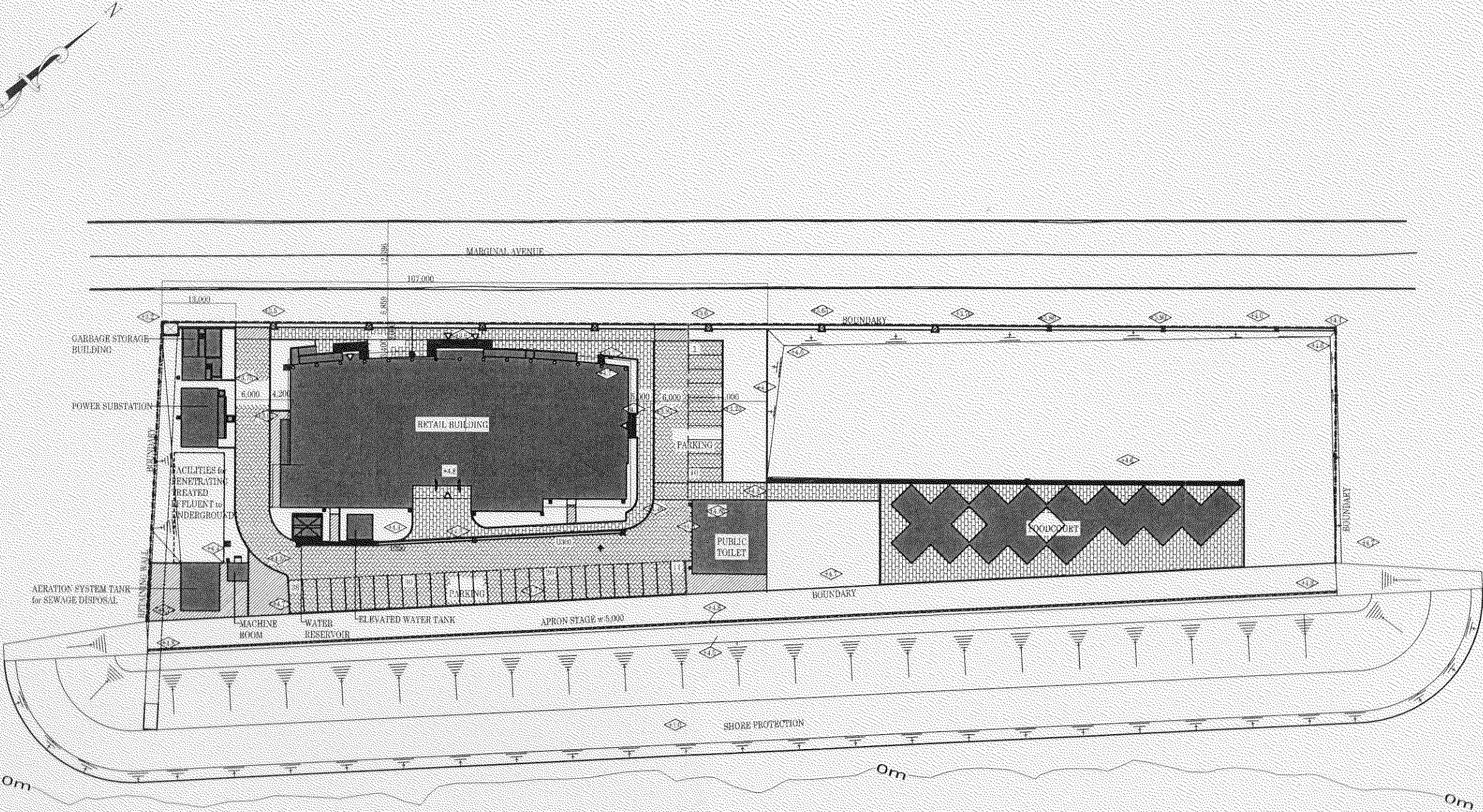
- W: minimum weight of the block on the slope (t)
 ρ_r : unit weight of the block in the air (as natural stone, 2.6t/m³)
 ρ_w : unit weight of sea water (1.03t/m³)
 θ : angle of the slope against the horizontal line (30% slope, 18°)
H: wave height at the front (2.3m)
 K_D : a constant depending a kind of block (3.9 in case of stacking rectangular stones in double layers randomly against non-broken waves)

(5) Recurved parapet and Apron

- ① The height of these facilities is designed as less than 1.2 meters for keeping view to shore side from the land side.
- ② With regard to wave pressure, the soil pressure on the backside land will be considered in setting the safety factor.
- ③ The intermediate wall will be installed between the apron and the pavement area in the land side for cutting connection.
- ④ The width of the pavement on the apron is determined as 5 meters in consideration of utilization of the construction equipment for maintenance.
- ⑤ The specifications of the pavement on the apron is determined as concrete paving because of ocean wave splashes.
- ⑥ Overcoming waves and ocean wave splashes will be gathered to the storm drain and discharged.
- ⑦ As the outlets of the storm drain is of a type of culvert due to outdoor facilities designing, it will be installed on the south edge of slope of Shore Protection.

2-2-2-4 Equipment Plan

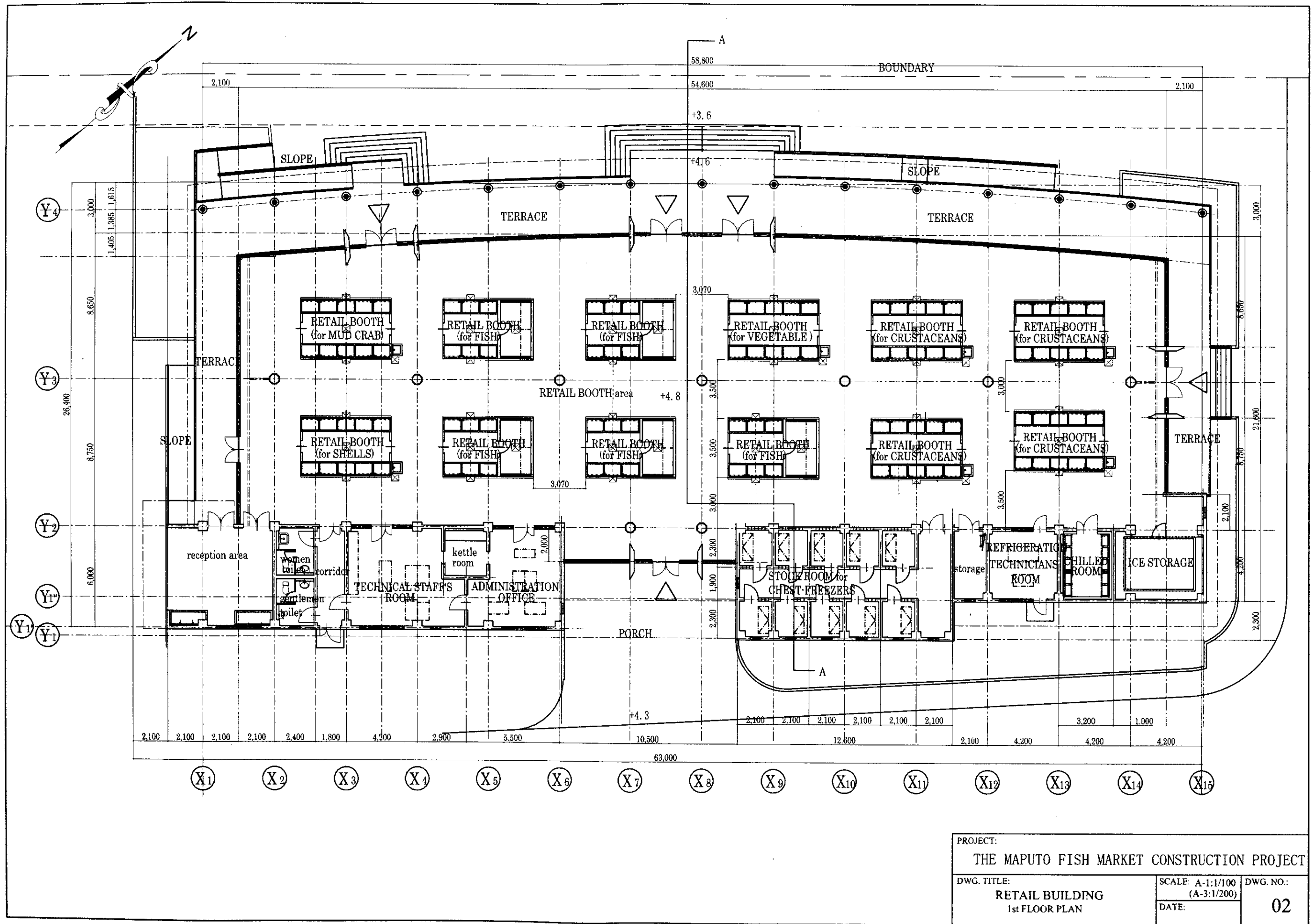
Name	Specification	Q'ty	Purpose
Insulated Fish Box	30 liters capacity, Poly-ethylene made	40 boxes	Preservation of shrimp
Cart	150 kg load, pallet size, 0.6mx0.9m, stainless steel made, fixed handle	5 units	Transport of goods
Primarily Treatment Table for Fish	Table size 1.5m(W) x 0.75m(D) x 0.8m(H), attached with the chopping board	10 units	Primarily processing of fresh fish
Platform Scale	Tare max. 100kg, minimum scale 20g, waterproof	2 units	Weighing for ice and others
Scale	Tare max. 4 kg, minimum scale 10g	2 units	Weighing of goods

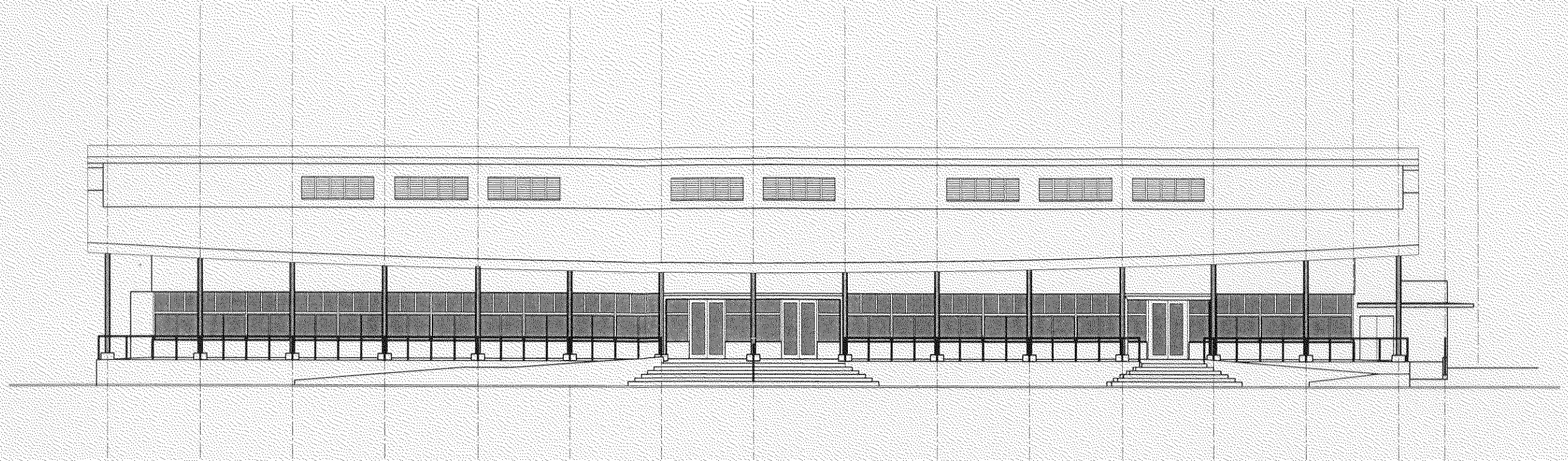


LEGEND

- Designed level
- Building
- Interlocking block pavement (for Pedestrian)
- Interlocking block pavement (for Vehicle)
- Concrete pavement

PROJECT: THE MAPUTO FISH MARKET CONSTRUCTION PROJECT		
DWG. TITLE: Site Layout Plan	SCALE A-1:1/400 (A-3:1/800)	DWG. NO.: 01
	DATE	



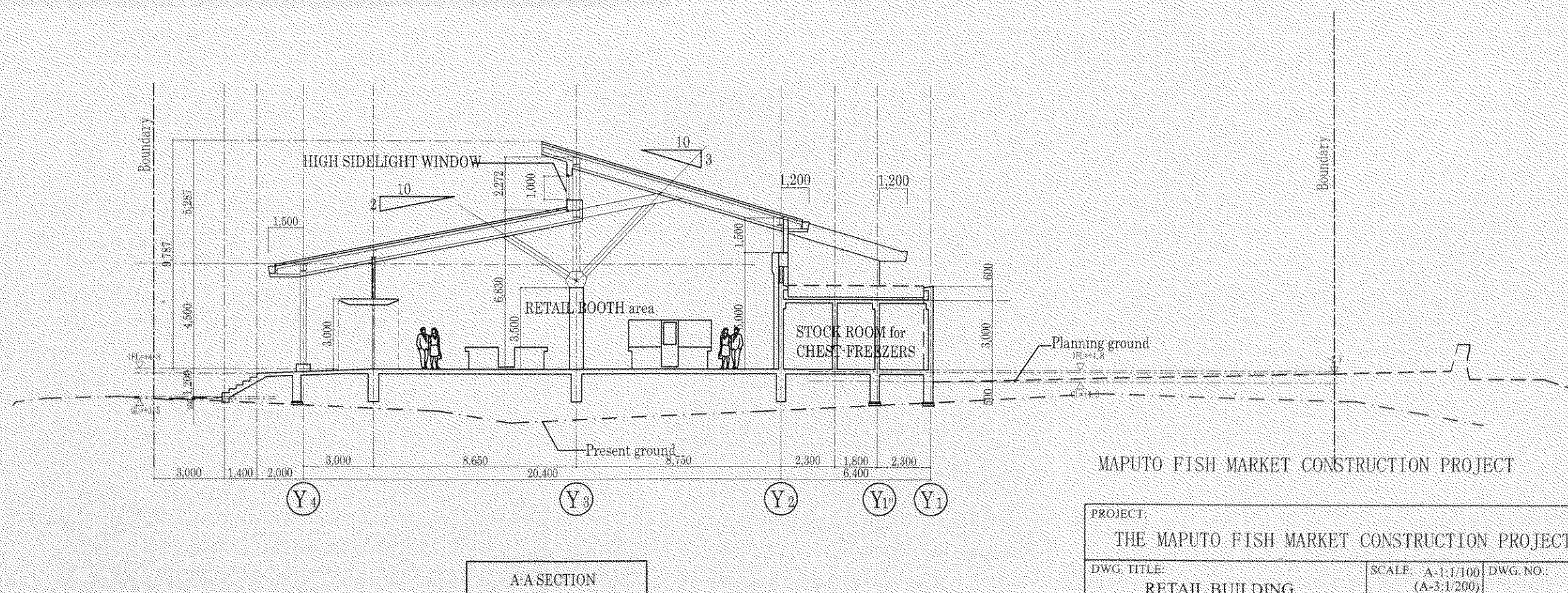
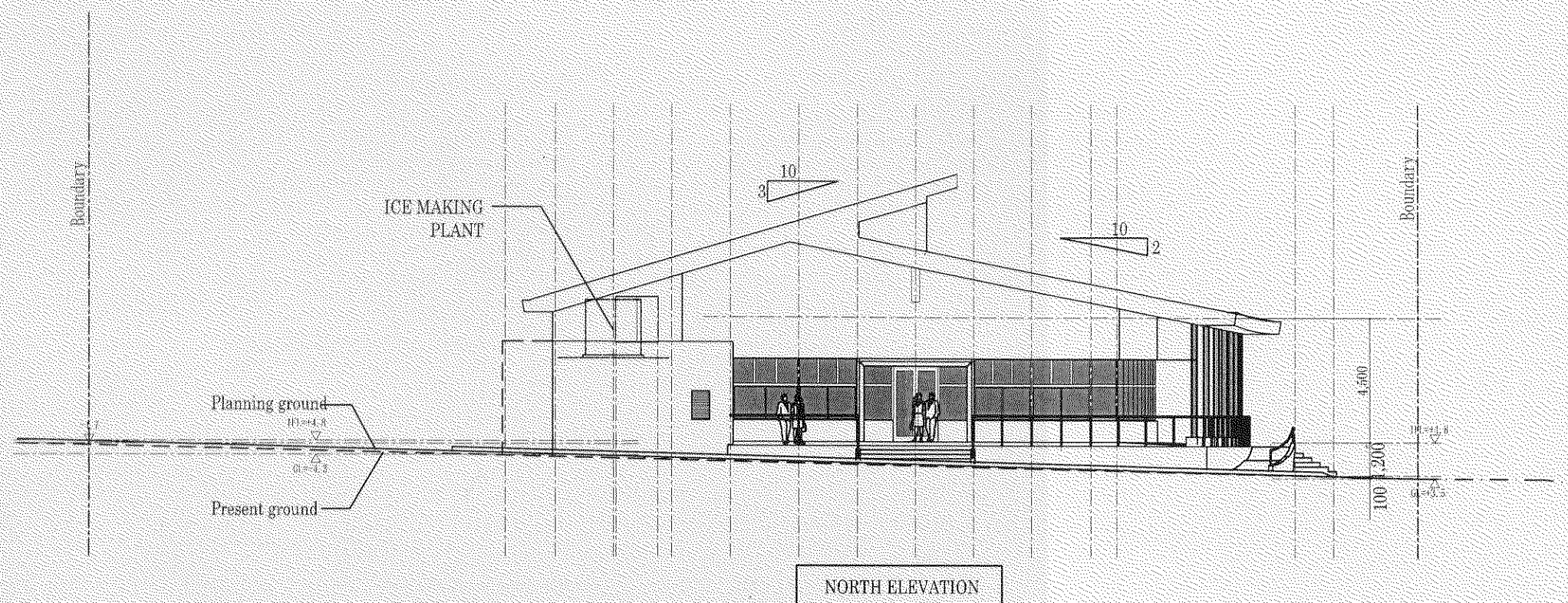


WEST ELEVATION



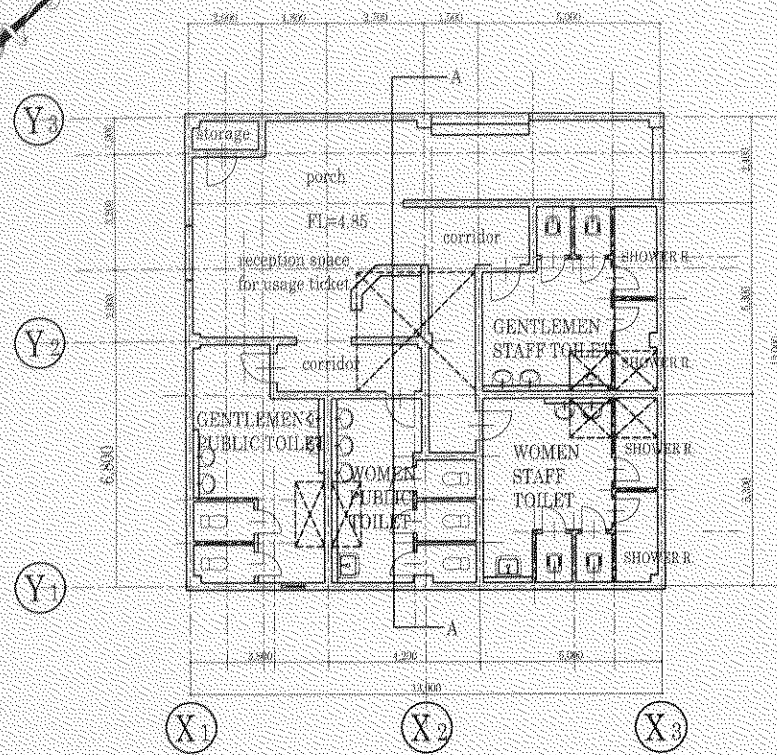
EAST ELEVATION

PROJECT: THE MAPUTO FISH MARKET CONSTRUCTION PROJECT		
DWG. TITLE: RETAIL BUILDING ELEVATION-I	SCALE: A-1:1/100 (A-3:1/200)	DWG. NO.:
	DATE:	03

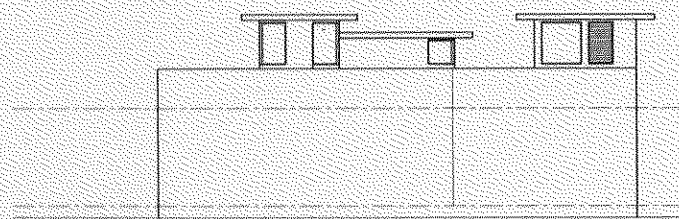


MAP

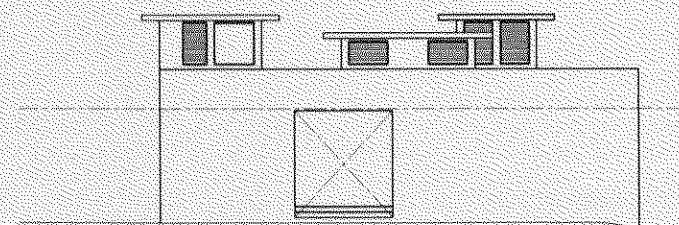
PUBLIC TOILET BUILDING



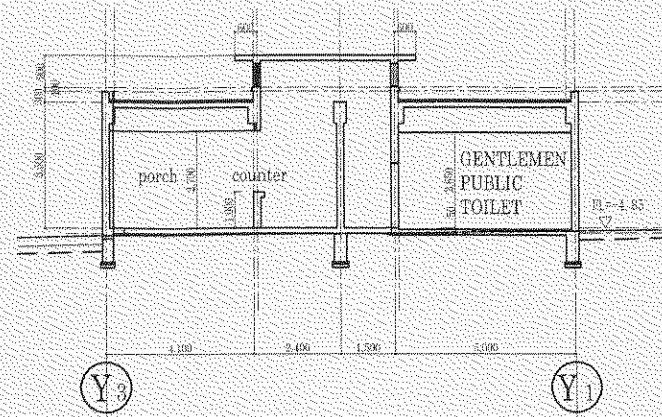
1st FLOOR PLAN



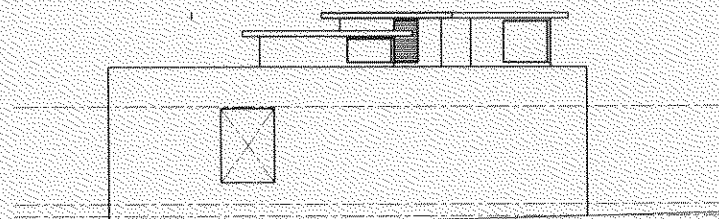
EAST ELEVATION



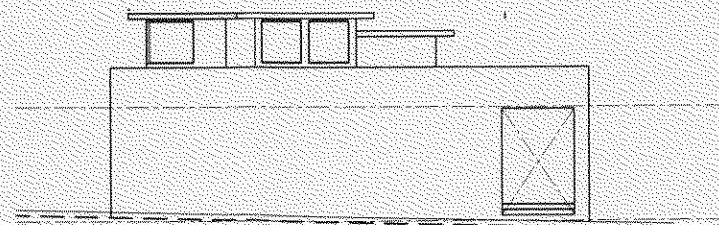
WEST ELEVATION



SECTION

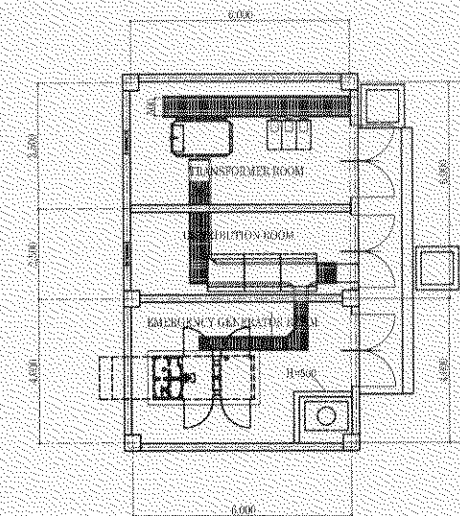


SOUTH ELEVATION

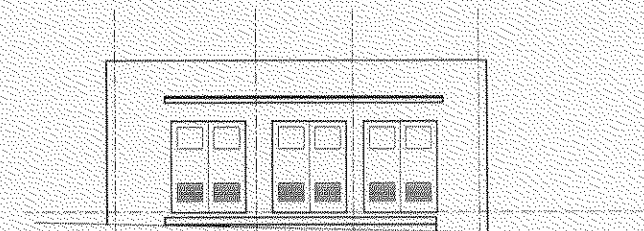


NORTH ELEVATION

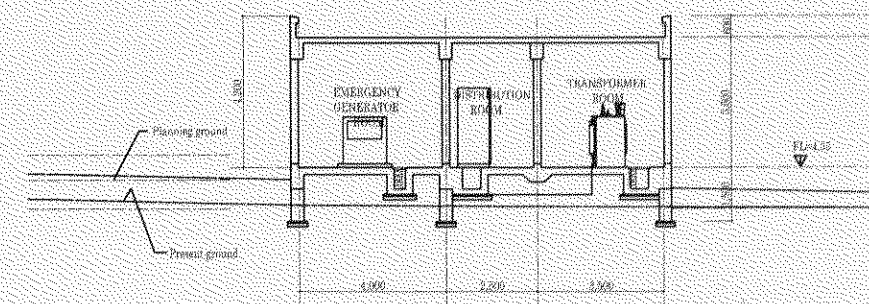
POWER SUBSTATION



1st FLOOR PLAN

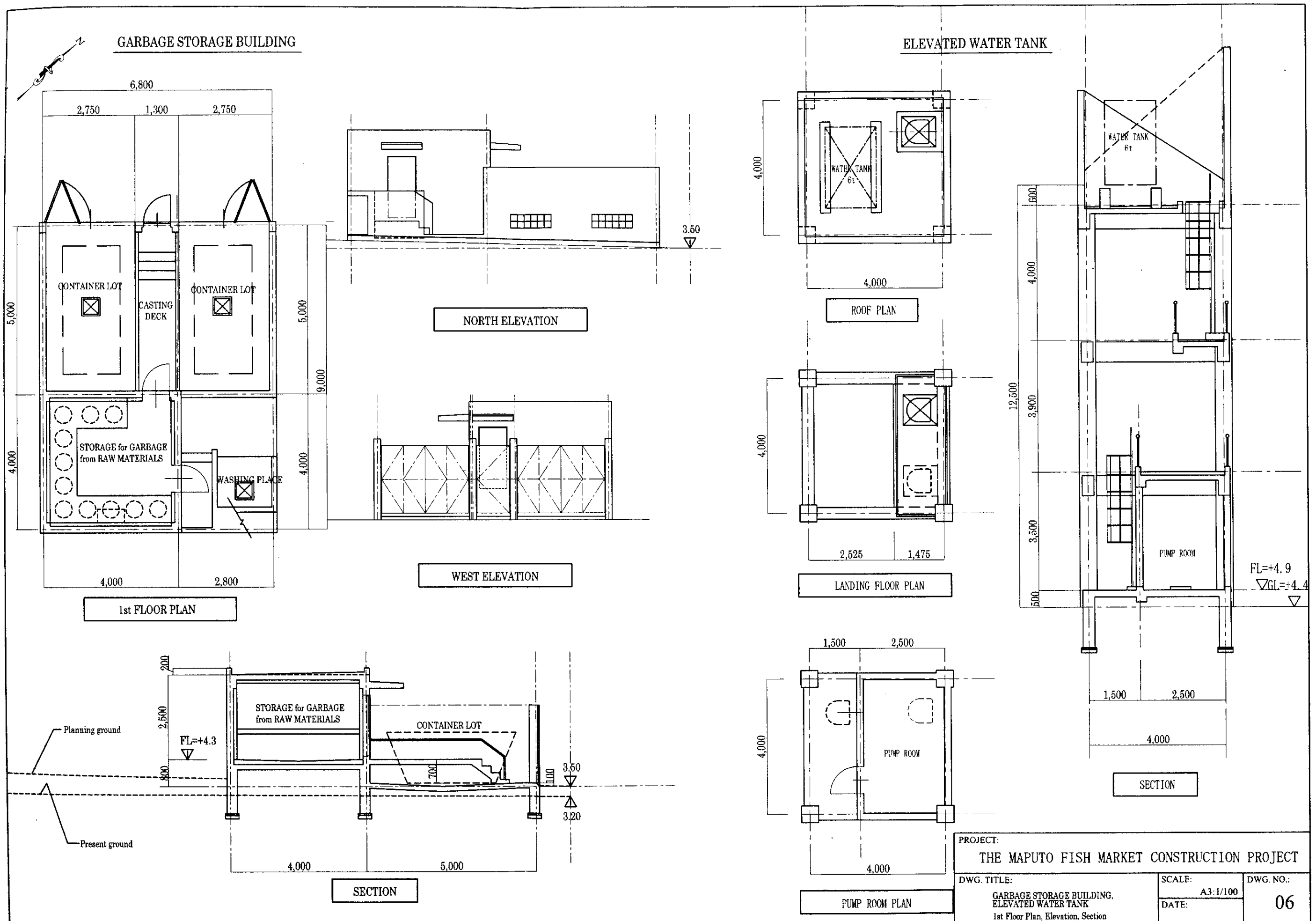


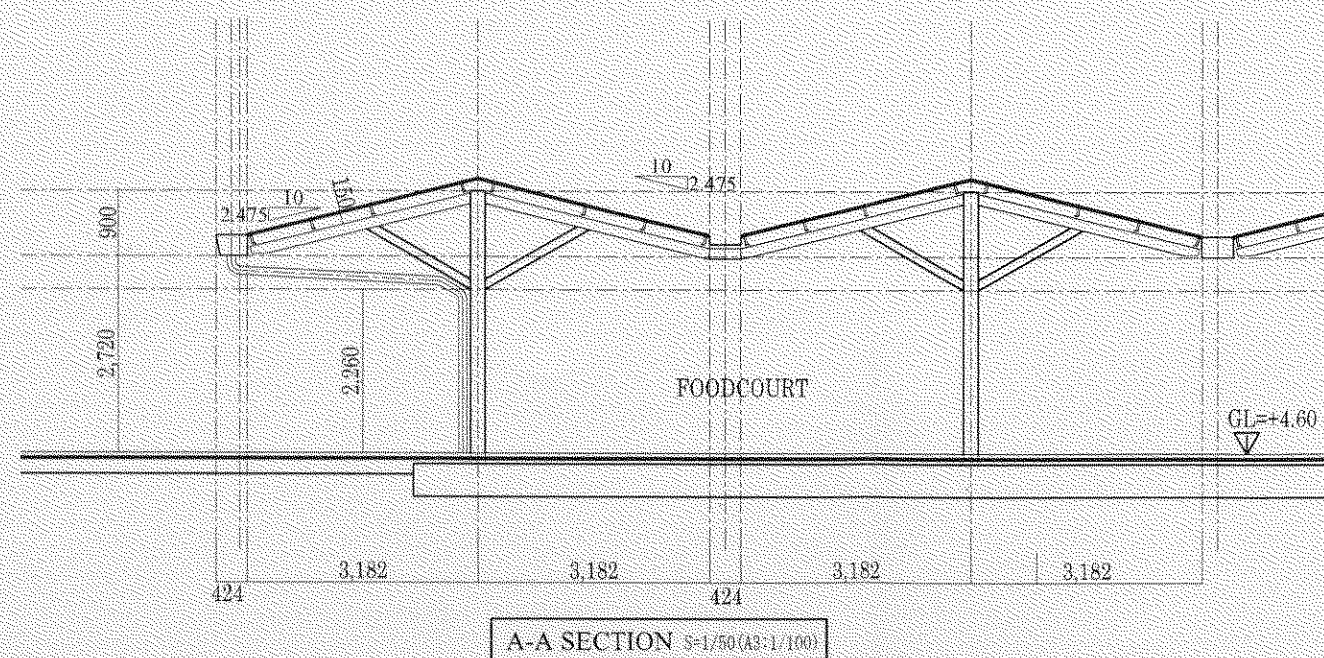
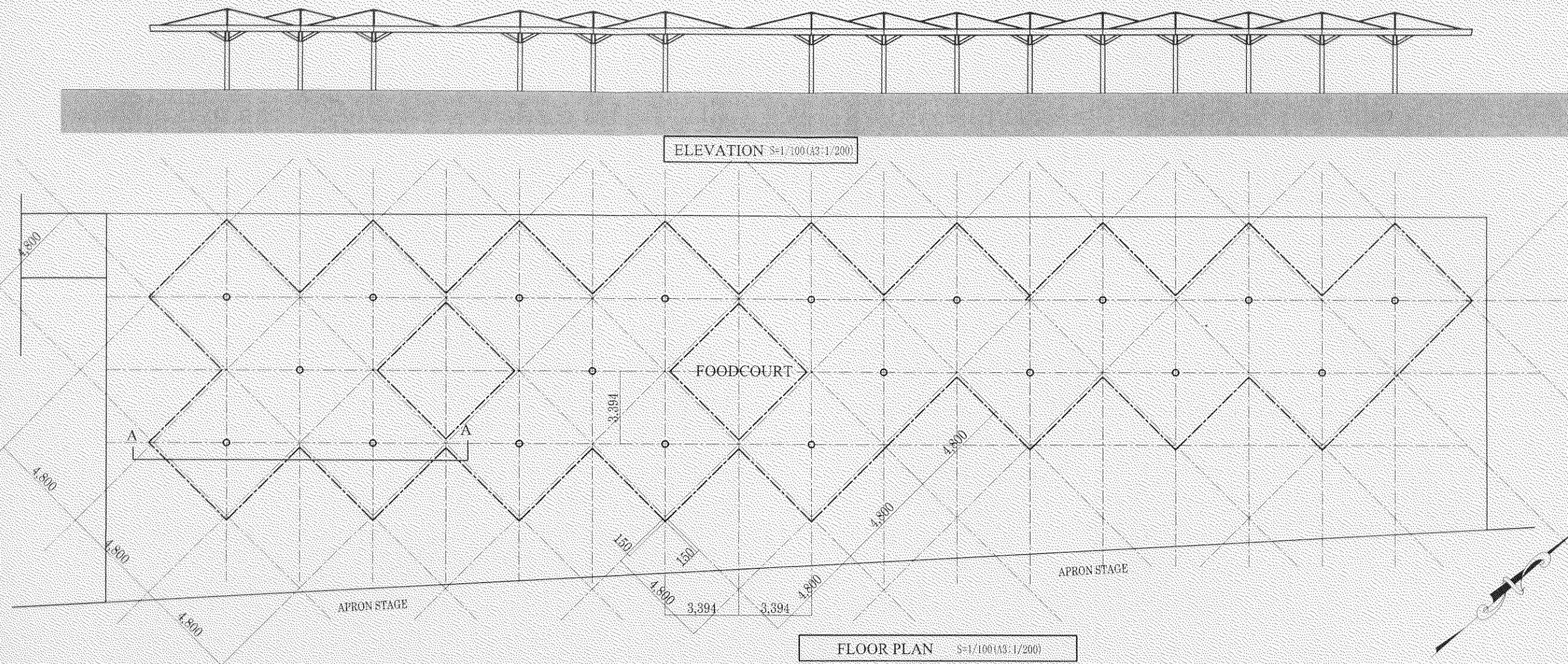
NORTH ELEVATION



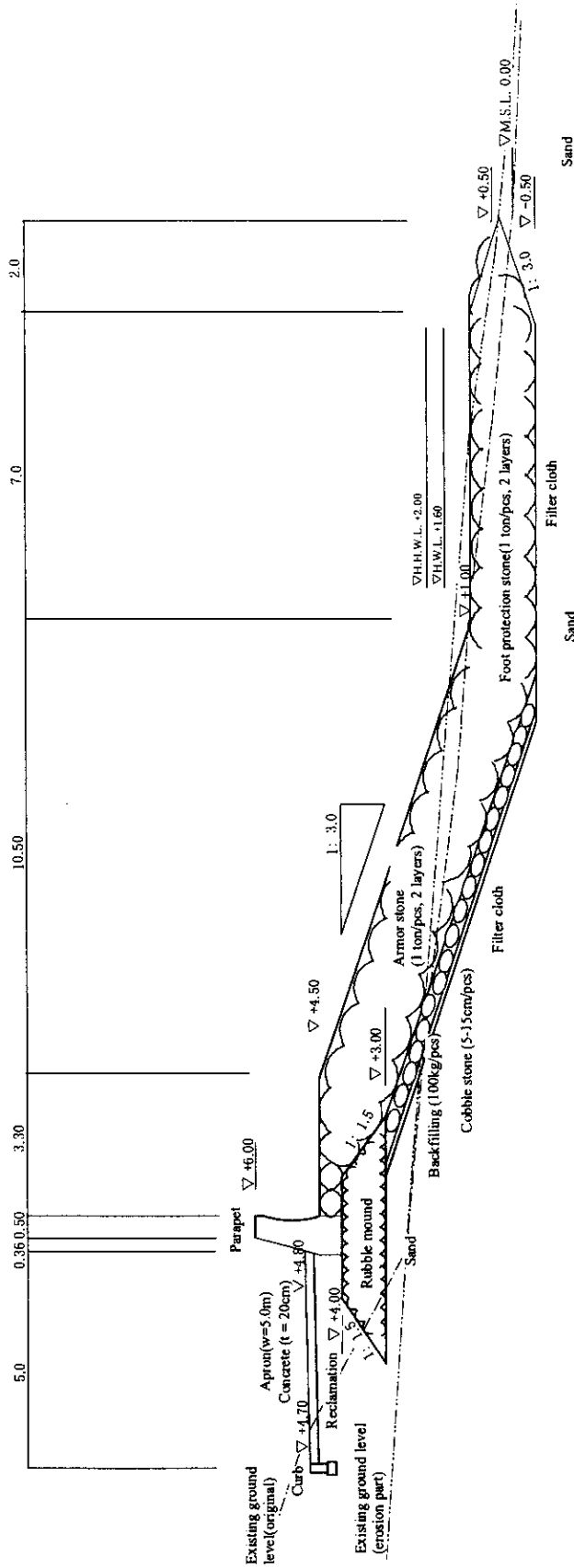
SECTION

PROJECT:		
THE MAPUTO FISH MARKET CONSTRUCTION PROJECT		
DWG. TITLE:	SCALE: A-1:1/100 (A-3:1/200)	DWG. NO.:
PUBLIC TOILET BUILDING, POWER SUBSTATION	DATE:	05
1st FLOOR PLAN, ELEVATION, SECTION		





PROJECT: THE MAPUTO FISH MARKET CONSTRUCTION PROJECT		
DWG. TITLE: FOODCOURT Floor Plan, Elevation, Section	SCALE: A-1:1/100, 1/50 (A-3:1/200, 1/100)	DWG. NO.: 07
	DATE:	



PROJECT

THE MAPUTO FISH MARKET CONSTRUCTION PROJECT

DWG. TITLE

Typical section of Revetment

SCALE
A-4 S:1/150

DATE

DWG. NO.

08

2-2-4 Implementation Plan

2-2-4-1 Implementation Policy

The construction works for this Project will be carried out in compliance with the following the implementation policy.

- ① In order to complete the works within a specified period, the construction works will be conducted under appropriate supervision in consideration of necessary approval & permissions, appropriate construction methods, appropriate material and equipment procurement, safety management, etc.
- ② Due consideration should be given to proper safety management measures because the site is fronted to the main road used frequently by the third parties and preserved trees on shore.
- ③ The implementation of the obligations by the Mozambique side such as restoration of taxes, budget preparation for custom charges and organizing of the operation system will be promoted.
- ④ With regard to the operation and maintenance for the machinery for the Project, the technical transfer will be promoted during the course of construction.
- ⑤ For facilitating maintenance, due consideration should be given to durability and local availability for selecting materials and equipment.

2-2-4-2 Implementation Conditions

- ① Due consideration should be given to safety management by fencing the land sides of the Project site and arranging guard men.
- ② Enough procurement period should be expected for armor stones because much time required for cutting them out.
- ③ Due consideration should be given to the occurrence noise and particulate matters because the number of tourists increase around the site in the weekend and the sightseeing season.
- ④ Due consideration should be given to safety management because the civil engineering works and the building construction works will be conducted simultaneously in the site of limited area.
- ⑤ Due consideration to the hygiene and health of the workers involved because the outside temperature tends to raise high.

2-2-4-3 Scope of Works

Supposing that this Project will be carried out by Japanese Grant Aid, the work responsibilities of the Project assigned to Japan and Mozambique are as specified below. Each country performs its assigned work at its expense.

1) Mozambique's obligations to the project

- ① To secure the planned construction site for this Project and to remove the existing facilities and obstacles in the site.
- ② To secure the land for a temporary construction yard and a field office.
- ③ To supply the water and electricity to the designated points in the Project site.
- ④ To procure necessary equipment such as furniture and fixtures required in the office of this Project.
- ⑤ To install necessary fences and gates and to provide planting.
- ⑥ To construct the facilities (shops, exterior works, equipment, etc.) for cooking services shops zone.

2) Japan's obligations to the project

- ① To conduct the construction works of the Japanese side such as Retail Building, Ice Making Plant, Chilled Room, Foodcourt, etc. for Maputo Fish Market.
- ② To provide consulting services such as detail designing, tender process assistance and construction supervision.
- ③ To provide all the construction materials and labor required to fulfill the construction works of the Japanese side in this Project.
- ④ To transport by sea and land all the imported materials and equipment required for this Project assigned to Japan, and to pay the necessary transportation insurance premium.

2-2-4-4 Consultant Supervision

- ① For the Consultant Supervision of this Project, efforts should be made to ensure that construction work is done in a consistent manner, keeping a designated level of quality for satisfactory delivery in consideration of the construction carried out by Japanese Grant Aid.
- ② The consultant is responsible for examining carefully the details of the planned construction work, process planning, quality control planning and others based on the contents of this Project's design and thereby taking appropriate measures for construction supervision.
- ③ Appropriate plans will be developed with respect to the procurement of materials and equipment, vehicles and office which are required for construction supervision, as well as various procedures, timeframes and methods associated with quality control.
- ④ In connection with personnel planning, the skill level, labor allocations, head counts and organization required will be examined carefully to ensure proper execution management.

2-2-4-5 Quality Control Plan

For quality control plan for this Project, emphasis will be placed on the building structure because it bears heavily on the basic performance, including durability and safety, of the facilities with focus on these items:

- ① In carrying out each major stage of construction work, the contractors are required to draw up plans describing the details of work including the method of construction employed, execution scheme and quality control planning and obtain the consultant's approval in advance.
- ② Basically, steel beams, reinforcing bars and steel pipe will be checked for quality by means of mill sheets.
- ③ Basically, cement will be checked for quality by means of the manufacturer's certificate of inspection.
- ④ Concrete will be checked for quality by inspecting data about manufacturing quality each day concrete is cast.
- ⑤ Concrete blocks will be checked for compression strength each time they are brought to the site.

2-2-4-6 Procurement Plan

General construction materials other than special ones are available relatively abundantly in Mozambique. However, some materials with the sufficient quality are difficult to obtain and have relatively high prices locally. Such materials will be imported from Japan or neighboring countries. The below table shows the classification and procurement sources of construction materials.

Construction material	Procurement source		Reason
	Local	Japan/Third countries	
Stone, aggregate, sand	○		Adequate specification for the project
Cement	○		Adequate specification for the project
Timber	○		Adequate specification for the project
Material for mould	○		Adequate specification for the project
Deformed bar		○	Economically preferable
Steel		○	Unobtainable locally
Steel door		○	Unobtainable locally
Roof material		○	Unobtainable locally
Tile	○		Adequate specification for the project
Paint	○		Adequate specification for the project
Lighting equipment	○		Adequate specification for the project
Air conditioner	○		Adequate specification for the project
Refrigeration equipment		○	Unobtainable locally
Construction machine	○		Adequate specification for the project

2-2-4-7 Operation Guidance Plan

For the purpose of this Project, no initial operation training will be provided.

2-2-4-8 Soft Component (Technical Assistance) Plan

As a result of discussion with the Mozambique side, the following matters were requested.

- ① Assistance for preparation of the rules & manuals necessary for operation & maintenance as a fish market.
- ② Assistance for synthetic maintenance system for the ice making plant, chilled room, etc.

(1) Necessity of Soft Components

Though the concerned market is operated in accordance with general market operation rules as one of 40 public markets operated by the Maputo City Administration, adequate operation & maintenance as a fish market presently can not be realized because of its characters of dealing the fishery products in collaboration with cooking services and non-description of the specific rules as a fish market in the general market operation rules. Furthermore, with regard to the present operation of the market, as the failure of collection of charges for retail sections and cooking services shops becomes a problem, it is necessary to improve the existing system of ticket usage, and charge collection and the procedures of collection and management of the garbage come from its operation are not proper, the following bottlenecks are recognized.

- ① As ratio of non-collection of the usage charges is large at present, it becomes necessary to provide guidance and assistance about knowhow for realizing proper accounting control.
- ② As the garbage is not collected and disposed correctly at present, it becomes necessary to provide guidance and assistance about knowhow for making the relevant rules.
- ③ In consideration that the Mozambique side has not enough experience in operation of the ice making plant and chilled room, it becomes necessary to provide guidance and assistance about knowhow with regard to operation & maintenance of the concerned facilities.

Furthermore, as the factors such as ice sales in the market and chilled room of the fresh products are originated from the characters of handling the fishery products and are not recognized in the operation of general public markets in the Maputo City, the Maputo City Administration has a limited experience in operation & maintenance of the concerned facilities.

Therefore, in order to assist initiation of the operation & maintenance of the concerned facilities of this fish market, the Soft Component should be implemented for assisting the establishment of operation & maintenance rules and operation & maintenance of the concerned facilities such as ice making plant.

(2) Activities of Soft Component

The Soft Component will be provided in the following framework:

Objective: To initiate smoothly an appropriate operation & maintenance function of the concerned facilities of the fish market.

- Outcome:
- 1. Establishment of basic rules for operation & maintenance for the concerned facilities of the fish market.
 - 2. Improvement of collection & accounting system of the usage charges for the concerned facilities & equipment of the fish market
 - 3. Establishment of maintenance plan for the ice making plant, chilled room,

emergency generator, etc.

Activities: 1-1. To make a plan of rules for operation & maintenance for the concerned facilities of the fish market.

1-2. To analyze the bottlenecks about operation & maintenance for the concerned facilities of the fish market.

1-3. To discuss on the operation and utilization of the concerned facilities by holding stakeholder meetings among the operation & maintenance body and the market users such as retailers, cooking services shops, etc.

1-4. To make draft rules for operation & utilization of the concerned facilities of the fish market.

1-5. To conduct a trial operation of the planned facilities in accordance with the draft rules for operation & utilization of the concerned facilities.

1-6. To modify draft rules for operation & utilization of the concerned facilities of the fish market after evaluation of the results of the trial operation.

2-1. To survey on the collection & accounting system of usage charges of the facilities & equipment in the similar facilities.

2-2. To examine proper system for collection & accounting of usage charges of the facilities.

2-3. To make draft procedures for collection & accounting of usage charges and draft accounting books of the facilities.

2-4. To conduct a trial implementation of collection & accounting of usage charges in accordance with draft procedures for collection & accounting of usage charges and draft accounting books of the facilities, and to recognize the bottlenecks on them.

2-5. To modify draft procedures for collection & accounting of usage charges and draft accounting books of the facilities after evaluation of the results of the trial implementation.

3-1. To make a draft of maintenance plan and maintenance notes for the ice making plant, chilled room, emergency generator, etc.

3-2. To explain operation procedures and the collaborated relation between the equipment such as ice making plant, chilled room, emergency generator, etc.

3-3. To clarify the maintenance procedures for the equipment such as ice making plant, chilled room, emergency generator, etc. and to coach actual maintenance jobs.

3-4. To instruct the methods of collection of operation data for the equipment such as ice making plant, chilled room, emergency generator, etc.

3-5. To coach the ways for recoding on the maintenance notes and analyzing the operation data for the equipment such as ice making plant, chilled room, emergency generator, etc.

3-6. To make maintenance plan and maintenance notes for the ice making plant, chilled room, emergency generator, etc.

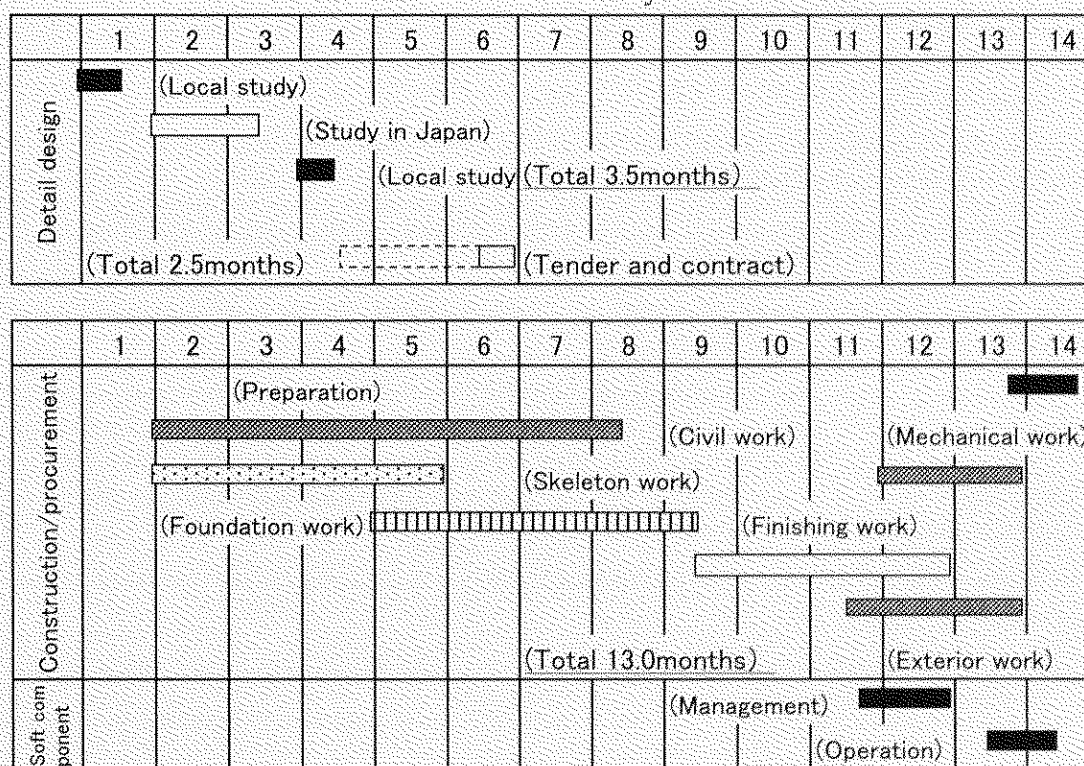
As consultants or NGOs capable of giving total guidance on the operation of the

concerned facilities of this Project cannot be found locally and, furthermore, the operation of concerned facilities of this Project is closely related to the designing the concerned facilities, it is considered as desirable to assign a Japanese consultant who was involved in the preparatory study is to participate and assign as Soft Component personnel. And, as counterpart for the Soft Component, the concerned personnel of the Maputo City Administration and the operation personnel of the concerned facilities of this Project will be assigned.

2-2-4-9 Implementation Schedule

It is estimated that implementation of this Project will take 3.5 months for execution design down to detail facilities designing and the acquisition of approval on tender documents, 2.5 months for the subsequent bid tendering and construction work contract signing, and 13 months for the acquisition of approval of the drawings, construction work and inspection after the contract with contractors. Table 2-19 shows the implementation schedule of this Project.

Table 2-19 Implementation Schedule



2-3 Obligations of Recipient Country

- ① To secure land for this Project and to demolish & remove the existing facilities and any obstacles in the Project site.
- ② To perform the legal procedures necessary in accordance with the laws of Mozambique with respect to the possible environmental and social impact of this Project and to notify in advance the parties concerned with the possible impact through bulletins and preliminary explanatory meetings.
- ③ To relocate the people illegally staying in the Project site and their barracks.
- ④ To acquire all the permits required in Mozambique with respect to the execution, construction and material procurement for this Project.
- ⑤ To conclude the Banking Arrangement required for this Project and to issue the necessary Authorization to pay without delay.
- ⑥ To ensure prompt duty-free customs clearance on the Mozambique side as required for the execution, construction and material procurement for this Project.
- ⑦ To allow exemption of or to restore the tax and other public duties imposed in Mozambique for the Japanese individuals and organizations engaging in construction work, material procurement and services for this Project.
- ⑧ To provide permission for entry and staying in Mozambique for the Japanese individuals who engage in the execution of this Project, and to ensure security during their stay in Mozambique.
- ⑨ To secure land for a temporary yard, a construction office and other facilities required for the execution of construction work for this Project.
- ⑩ To implement measures for prohibiting outside persons from entering the Project site during the construction work of this Project.
- ⑪ To install the fences and gates and to conduct works for water-supply piping and electric supply required for this Project.
- ⑫ Immediately after the completion of construction works of the Japanese side, to implement the construction works of the Mozambique side such as the compensation construction of the facilities for the cooking services shops, and to perform the removal procedures and the closure process of A Luta Continua Market after the completion of construction works of the Mozambique side.
- ⑬ To procure the office equipment, furniture and fixtures required for the execution of this Project.
- ⑭ To pay other expenses required for the execution of this Project but are not borne by the Japanese Government under the Japanese Grant Aid.

2-4 Project Operation Plan

(1) Operation organization

Figure 2-5 shows the planned operation organization of the Maputo Fish Market, which incorporates the following modifications into the existing operation organization of A Luta Continua Market (that is, four personnel such as Chief Inspector, Financial Chief, Hygienic Chief and Chief Security, the cleaning works done by retailers cooperatively).

- ① To assign an Accountant to promote the independency of accounting.
- ② To operate the newly established Public Toilet Building and the Ice Making Plant properly.
- ③ To improve the quality of the fishery products dealt in the Maputo Fish Market.
- ④ To realize the proper cleaning procedures by providing full-time cleaning workers.
- ⑤ To realize the suitable security inside the market property.

This results in the increase of staffs such as one Accountant, five staffs for Ice Plant operation, one Quality Control Chief and seven workers against the present personnel.

With regard to the organization of the Maputo Fish Market, each job is demarcated to each job section under management of the Chief Inspector, who is dispatched as a person for responsibility for market operation from the Public Market Department of Maputo City Administration, and chief staff or chief engineer is allocated for each section.

IDPPE plays a role in advisory and guidance assistance in the fish market operation at the standpoints of fish marketing and quality control. This assistance will be concerned with freshness control during transportation, retailing and storage, freshness maintenance and package management under close collaboration with Quality Control Chief of market operation personnel.

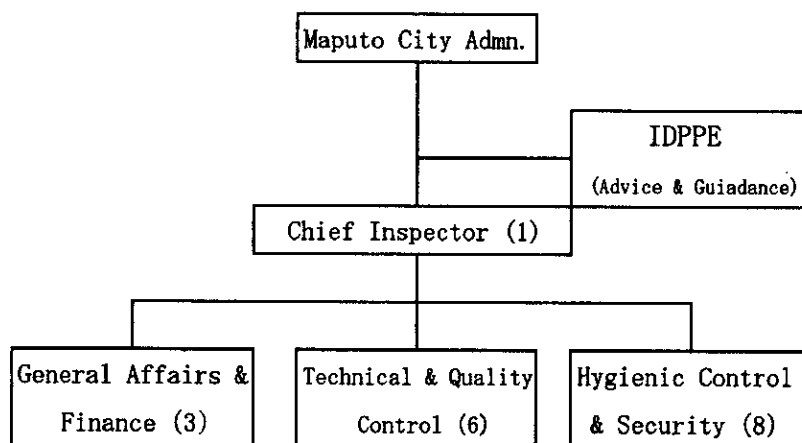


Figure 2-5 Organization of the Operation Body of Maputo Fish Market

Table 2-20 Operation Personnel of the Operation Body of Maputo Fish Market

Job	Position	No	Job description
General	Chief Inspector*	1	Person responsible for fish market operation.
Affaires	Secretary	1	Assistant in documents management and communication.
Finance	Financial Chief *	1	Budget/financial/charge collection/payment management.
	Accountant	1	Accounting of usage fee/ice sales/ storage charge/etc.
Technical	Refrigeration Engineer	2	2 shifts (day/night), operation/maintenance chief engineer.
	Electrician	1	Operation/maintenance for machine and electric facilities.
	Ice Sales Clerk	1	Ice packing/sales, daily maintenances of ice machine.
	Chilled Room Clerk	1	Products handling, daily maintenances of chilled room.
Quality Control	Chief	1	Advice/guidance such as inspection on sales/storage conditions of products, mediation of weighing dispute, etc.
Hygienic Control	Chief*	1	Management on cleaning, toilet use and garbage collection.
	Cleaning Worker	2	Usage ticket collection, cleaning various facilities.
	Toilet Worker	1	Ticket collection and cleaning for toilet usage.
Security Control	Chief *	1	Security management and communication with police.
	Guard men (worker)	3	3 shift(day/night /midnight), patrol.
Total		18	

Remark: The personnel in the position marked as * is one of the present organization in A Luta Continua Market. As the cleaning activities are conducted jointly by retailers presently, adequate cleaning is not realized.

(2) Operation method

The following is the operation system the Maputo Fish Market :

Business days: No closing days except end-year/new-year days. Operation personnel will take holiday on dull Tuesday or Wednesday on turn.

Business hours: From 10:00am to 10:00pm.

Operation system:

- 1) Retail Section Rental: Daily charge 10 Mt/section, Payment by pre-purchase of 10 or 30 sheets ticket book, Date stamping on the ticket on use.
- 2) Cooking Services Shop Rental: Monthly charge 3,600 Mt/50m²-shop, Bank transfer at end of month.
- 3) Toilet Usage: Usage charge 5 Mt/usage, Payment by cashing or ticket by pre-purchase of 10 or 30 sheets ticket book, Customers and shop staffs use tickets bought by shop owner. Retailers buy the book for themselves.
- 4) Car Parking Usage: Usage charge 20 Mt/usage, Payment by cashing or ticket by pre-purchase of 10 or 30 sheets ticket book, Customers and shop staffs use tickets bought by shop owner. Retailers buy the book for themselves.

- 5) Ice Sales: Ice price 5 Mt/kg for fish marketing and 10 Mt/kg for general usage. Combination sales with 1 kg , 2 kg and 5 kg bags to be prepared in advance. Payment by pre-purchase of 10 or 30 sheets kg-ticket book. Same amount of ice is exchanged for kg-tickets.
- 6) Chilled Room Usage: One day storage charge 20 Mt/box including usage fee for insulated box, Payment by pre-purchase of 10 or 30 sheets ticket book, Date stamping on the ticket on deposit and ticket collection on draw.
- 7) Stock Room for Chest-freezer Rental: Monthly charge 900 Mt/room, Bank transfer at end of month.

2-5 Project Cost Estimation

2-5-1 Initial Cost Estimation

(1) Project Cost borne by the Mozambique Side

Project cost borne by the Mozambique side is estimated as 129,484,000 Mozambique Meticaís (Mt). Table 2-21 shows the contents of the project cost.

Table 2-21 Project Cost Borne by the Mozambique Side

Cost Item	Amount
	(Mt)
Environment and Social Consideration fee	1,200,000
The removal of the existing facilities and any obstacle in the Project site.	200,000
The necessary fell of the trees in the Project site.	2,032,500
Connection of electricity, water service and telephone line to the Project site.	1,219,500
Construction of the necessary fence and gates for the Project site.	1,000,000
Procurement of office supplies and furniture for the Project.	200,000
Necessary planting and exterior works in the Project site.	1,106,000
Compensation construction of the facilities for the cooking services shops.	80,000,000
Fee for banking arrangement and issuance of authorization to payment.	376,000
Compensation budget for internal taxes and custom clearance.	42,240,000

(2) Condition of Estimation

- ① Date of estimation base : April 2011
- ② Exchange rate : 1USD=83.48 Yen (Average of the past 6 months)
: 1Mt=2.4588 Yen (Average of the past 6 months)
- ③ Construction periods : As shown in the table 2-19.
- ④ Others : Cost estimation is in accordance with the framework of Japanese grant aid scheme.

2-5-2 Operation and Maintenance Cost

(1) Prediction on Profit & Loss for Operation

With regard to the operation of the Maputo Fish Market, though monthly operation profit as 253,350 Meticaís (661,800 Mt – 408,450 Mt) will be estimated to be gained, this amount does not seem as abundant profit in consideration of the middle & long term maintenance expenditure. This is partly because that usage charges are set up relatively lower level in consideration of public facilities.

Table 2-22 Prediction on Profit & Loss for Operation of the Maputo Fish Market

(unit: Mt)

Item		Calculation
Monthly Operation Income		
Retail Place rental	30,000	10 Mt/place · day x 100 places x 30 days
Cooking Services Shop rental	144,000	3,600 Mt/50 m ² place · month x 40 places
Toilet usage	75,000	5 Mt/use x 500 uses/day x 30 days
Car Parking usage	79,800	20 Mt/use x 38 parking x 3.5turns/parking x 30days
Ice sales	300,000	2 Mt/kg x 2,000 kg/day x 30 days
Chilled room usage	24,000	20 Mt/box · day x 40 boxes/day x 30 days
Usage of Stock Room for Chest-freezer	9,000	900 Mt/ room · month x 10 rooms
Total Income	661,800	
Monthly Operation Cost		
Salary	180,120	Calculated by Mozambique side based on Table 2-20.
Garbage collection fee	13,200	1,100 Mt/time x12 times /month
Consumable item cost	30,000	Cleaning tools cost estimated by Mozambique side.
Communication cost	10,000	Estimated by Mozambique side.
Water supply cost	17,790	Details referred to Table 2-23.
Electricity supply cost	127,340	Details referred to Table 2-23.
Daily maintenance cost	30,000	Estimated by Mozambique side.
Total Monthly Cost	408,450	
Total Monthly Profit	253,350	

Table 2-23 Calculation of Cost for Water Supply and Electricity Supply for Operation of the Maputo Fish Market

(unit: Mt/month)

Item	Monthly cost	Usage amount and Unit charge	Calculation details
Water supply charge	17,790 Mt	936.3 m3/month and 19 Mt/ m3	Total : 936.3 m3 = 31.21 m3/day x 30 days ; For one day; 31,21m3 = floor cleaning 11.95m3 + ice making 2.5m3 +toilets 7.76 m3 + cooking services usage 9.0 m3
Electricity supply charge	127,340 Mt	27,444Kwh/month and 4.64Mt/ Kwh	Total : 27.444 Kwh = 914,8 Kwh/day x 30 days ; For one day; 914.8 Kwh = illumination 200 Kwh + ice making 500.4 Kwh + air conditioning 134.4 Kwh + garbage storage cooling 80 Kwh

With regard to the middle & long term maintenance for the Maputo Fish Market, the funds shown on Table 2-24 and Table 2-25 are required.

Table 2-24 Funds for Maintenance of the Maputo Fish Market Buildings

Period	Cost	Contents
every 5 year	302,700 Mt	Painting repair on market buildings and pavement repair.
every 10 year	1,800,000 Mt	Roof repair and equipment renewal for air conditioners and pumps.
every 15 year	720,000 Mt	Anti-corrosion painting repair on market buildings.

Table 2-25 Funds for Maintenance of the Ice Making Plant

Period	Cost	Contents
every 2.5 year	4,500 Mt	Renewal of refrigeration oil.
every 5 year	58,100 Mt	Renewal of movements parts of compressor and generator butterfly.
every 10 year	1,296,000 Mt	Renewal of main parts of compressor, air coolers for chilled room & ice storage and ventilators.

(2) Recommendations on operation system and operation profit & loss

- ① As the financial jobs and accounting are conducted by one person presently at A Luta Continua Market, usage charge collection is not conducted efficiently and non-collection ratios of retail section charge and cooking services shops charge are about 18 % and 67 % respectively. Especially, the amount of non-collection of cooking services shops is a problem in its operation. As there is not much surplus in the operation profit as above-mentioned, non-collection of retail section charge and cooking services shops charge may result in loss in its operation. In consideration of this situation, the adequate management on usage charge collection should be realized though the accounting personnel is strengthened in this Project.
- ② With regard to collection of usage charge such as retail section charge, though the way to issue a ticket for receipt of cash is presently conducted, this may result in omission of collection and mistakes in cash management. Concerning this situation, with regard to usage charges for retail section, car parking, toilets, etc., it is recommended to adopt a prepaid system and to demarcate the cash flow at buying tickets (single ticket, 10 sheets book, 30 sheets book) at the Administration Office, from the flow of the use of tickets at the occasion of usage of the concerned facilities. On the other hand, with regard to payment delay for monthly rental facilities such as cooking services shops and stock room of chest-freezer, it is desirable to take severe measures such as allowance for only one month payment delay (furthermore delay penalty of 10 % charge is added to rental charge) and cancellation of rental for three months payment delay penalty (cancellation notice at two months payment delay) as these conditions should be notified in the rental agreement. The concerned situation should be paid attention through reporting of the payment delay records in the monthly meeting of the concerned parties for operation of Maputo Fish Market.
- ③ With regard to advisory and guidance assistance of IDPPE for operation of the Market at the standpoints of fish marketing and fish quality control, it is recommended to pay attention on the following factors. The advisory and guidance assistance should be conducted in the style of collaboration with the Quality Control Chief of personnel of the Market operation and in the monthly meeting including the Chief Inspector, other Chiefs, stakeholders (retailers and cooking services shop operators). The advisory and guidance items should better include a) packing & preservation specifications (concerning ice use ratio, packing materials, etc.) on transportation from fish landing area to fish market, b)

products handling & preservation specifications on spot sales (concerning ice use ratio, table cleaning, wet control, etc.), c) preservation specifications on storage at night (concerning ice use ratio, stoking procedures, etc.) and d) efficient products sales in accordance with its freshness (notice of products arrival date, proper pricing, consideration on selling off, etc.).

- ④ As disbursement of the reasonable amount cost for periodical maintenance for the facilities for this Market is predicted as shown in Table 2-24 and Table 2-25, in order to secure the funds for this disbursement, it is considered rational to reserve a part of the above-mentioned operation profit monthly for funds for maintenance and to prepared for the disbursement of maintenance. As shown in Table 2-26, the monthly installment savings, e.g. monthly 35,000 Mt (less than 15 % of the predicted profit of 253,350 Mt) may cover this maintenance cost requirement.

Table 2-26 Installment Savings and Mid & Long Term Maintenance Cost

Cost Item / Operation Term	2.5 yrs	5 yrs	7.5 yrs	10 yrs	12.5 yrs	15 yrs	17.5 yrs	20 yrs
Market bldg. painting, etc.		302,700		302,700		302,700		302,700
Roof Repair, etc.				1,800,000				1,800,000
Anti-corrosion painting, etc.						720,000		
Ice plant ref. oil	4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500
Ice plant parts renewal		58,100		58,100		58,100		58,100
Ice plant main parts renewal				1,296,000				1,296,000
Total Cost in term	4,500	365,300	4,500	3,461,300	4,500	1,085,300	4,500	3,461,300
Total Installment Savings in term by 35,000 Mt/month	1,050,000	1,050,000	1,050,000	1,050,000	1,050,000	1,050,000	1,050,000	1,050,000
Remained Installment Savings in term end	1,045,500	1,730,200	2,775,700	364,400	1,409,900	1,374,600	2,420,100	8,800

Remarks: Total Installment Savings in term is corresponding the total amount of monthly installment savings as 35,000 Mt per month for 30 months (2.5 Years).

Chapter 3 Project Evaluation

Chapter 3 Project Evaluation

3-1 Preconditions

As preconditions for implementation of this Project, the followings are main items to be performed by the Mozambique side.

① Acquisition of environmental license

Explanation and notice in advance to the stakeholders influenced by the removal of the existing market, implementation of EIA, acquisition of environmental license (permission for development project) from MICOA, and acquisition of permission necessary for construction and equipment procurement.

② Acquisition of land for construction

Acquisition of land of the Project site, demolition & removal of the existing facilities and any obstacles and necessary cutting off of the trees in the Project site, relocation of the people illegally staying in the Project site and their barracks, assurance of the land for a temporary yard, a construction office and other facilities required for the execution of construction work for this Project, and implementation of the measures for prohibiting outside persons from entering the Project site during the construction work of this Project.

③ Measures responding to smooth progress of the Project

Immediate conclusion of the banking arrangement and issuance of authorization to payment, provision of permission for entry and staying in Mozambique for the Japanese individuals who engage in the execution of this Project and assurance of security during their stay in Mozambique, restoration of the tax and other public duties imposed in Mozambique for the Japanese individuals and organizations engaging in construction work, materials procurement and services for this Project, and assurance of prompt duty-free customs clearance on the Mozambique side as required for the execution, construction and materials procurement for this Project.

④ Obligations of the Mozambique side

Implementation of the works for water-supply piping and electric supply, procurement of the office equipment, furniture and fixtures, and installation of the fences and gates required for the execution of this Project.

3-2 Necessary Inputs by Recipient Country

In order to realize and maintain the effectiveness of this Project, the followings are matters to be conducted by the Mozambique side.

① Smooth removal of the market

Immediately after the completion of construction works of the Japanese side, to implement the construction works of the Mozambique side such as the compensation construction of the facilities for the cooking services shops, and to perform the removal procedures and the closure process of A Luta Continua Market after the completion of construction works of the Mozambique side.

② Operation and maintenance of the Maputo Fish Market

To operate and manage the facilities and equipment introduced by this Project by assurance of the necessary operation personnel and operation & maintenance budgets.

③ Establishment of the cooperative system among the parties concerned

To establish the cooperative system among implementation bodies such as Maputo City Administration and IDPPE with regard to the establishment of adequate operation rules & manuals as a public fish market, the performance of financial obligations necessary for maintenance funds, etc.

④ Accurate awareness of the effectiveness by Project

To implement the measurement of the effectiveness by Project periodically and continuously for the purpose of accurate awareness of the effectiveness of implementation of the Project in order to promote the continuous development of the Project.

3-3 Important Assumptions

The followings are the important assumptions for realizing and maintaining the effectiveness by Project.

- ① The remarkable decrease of the production of the fishery products should not occur due to deterioration of the weather conditions, etc.
- ② The remarkable increase of the commodity prices should not occur.

3-4 Project Evaluation

3-4-1 Relevance

Due to the followings factors, it is considered proper to implement the Japanese Assistance by means of Japanese grant aid cooperation.

- ① The beneficiaries by this Project are ordinary nations such as artisanal fishermen, retailers, etc. including poverty society and those numbers are a lot.
- ② The facilities and equipments of this Project are possible to be operated and maintained by the personnel, techniques and funds of the Mozambique side without any special advanced technology.
- ③ This project contributes the achievement of the objectives of the Strategic Plan for Artisanal Fisheries Development of Mozambique.
- ④ The profitability of the operation in this Project is of a range for expectation for smooth operation & maintenance of the facilities and equipment of the Project.
- ⑤ Though there are negative impacts in social & environmental factors such as occurrence of the business transfer of the concerned parties of the existing market, adequate measures are taken for eliminating the related influence.
- ⑥ This Project is possible to be implemented under the system of Japanese grant aid cooperation without any special difficulty.

3-4-2 Effectiveness

The following effectiveness is expected by the implementation of this Project.

1) Quantitative Effectiveness

Indicator of Effect	Basis (2011)	Target (2015)
Amount of the fishery products dealt in accordance with "Guidelines for Operation & Management of Maputo Public Markets, 2008"	0 tons/year	Approx. 350 tons/year
Amount of ice possible to be purchased in the Fish Market	0 tons/day	Approx. 2 tons/day
Number of retailers who deal the products in the appropriate business environment	0 persons	Approx. 100 persons
Number of cars parked regally in the Fish Market	0 cars	Approx. 38 cars

2) Qualitative Effectiveness

- ① The public fish market, which would satisfy the conditions for the Group A (the public market category where the market infrastructures such as ceiling provision, pavement, water & electricity supply, car parking provision, etc. are basically arranged) and would fulfil "Guidelines for Operation & Management of Maputo Public Markets, 2008", is realized.
- ② It will become possible to provide more hygienic and qualified retail transactions of the fishery products to users of approx. 310 thousand persons annually.
- ③ With regard to the operation and maintenance of the Maputo Fish Market, the management of usage charge collection & accounting and the operation & maintenance of the ice making plant, chilled room and the emergency generator are conducted adequately.

Based on the above perspective, the project is judged as highly appropriate and the effectiveness of the Project is expected.